DRINKING WATER SURVEILLANCE PROGRAM

NORTH BAY WATER TREATMENT PLANT

ANNUAL REPORT 1990

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

NORTH BAY WATER TREATMENT PLANT
1990 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 systems were being monitored.

The North Bay water treatment plant is a pumping station which partially treats water from Trout Lake. The process consists of alkalinity adjustment, fluoridation and disinfection. This plant has a rated capacity of 22.5 x 1000 m^3/day. The North Bay water treatment plant serves a population of approximately 50,000.

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall.

Table A is a summary of all results by group.

No known health related guidelines were exceeded.

The North Bay water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

The detection of elevated lead in the standing samples in the distribution system would indicate that household taps should be flushed well before the water is used for consumption.

93-02472/

TABLE A

DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP

SUMMARY TABLE BY SCAN

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

SCAN	SITE RAW TESTS	SITE RAW POSITIVE	SITE RAW %POSITIVE	TREATED TESTS	TREATED POSITIVE	TREATED %POSITIVE	SITE 1 TESTS	SITE 1 POSITIVE	SITE 1 %POSITIVE	SITE 3 TESTS	SITE 3 POSITIVE	SITE 3 %POSITIVE
BACTERIOLOGICAL	33	20	60	11	1	9	10	9	90	8	1	12
CHEMISTRY (FLD)	39	39	100	69	69	100	107	103	96	89	88	98
CHEMISTRY (LAB)	252	202	80	252	202	80	396	363	91	317	292	92
METALS	288	64	22	288	70	24	507	200	39	414	140	33
CHLOROAROMATICS	168	0	0	154	0	0	154	0	0	126	0	0
CHLOROPHENOLS	12	0	0	12	0	0	.	.	.	.	.	.
PAH	203	0	0	186	0	0	17	0	0	17	0	0
PESTICIDES & PCB	397	0	0	388	0	0	234	0	0	190	0	0
PHENOLICS	12	0	0	12	0	0	.	.	.	.	.	.
SPECIFIC PESTICIDES	64	0	0	63	0	0	11	0	0	9	0	0
VOLATILES	348	0	0	319	33	10	319	33	10	261	27	10
TOTAL	1816	325		1754	375		1755	708		1431	548	

DRINKING WATER SURVEILLANCE PROGRAM

NORTH BAY WATER TREATMENT PLANT
1990 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1990, 76 systems were being monitored.

Appendix A has a full description of the DWSP.

The DWSP was initiated for the North Bay water treatment plant in the spring of 1987. Previous annual reports have been published for 1987, 1988 and 1989.

PLANT DESCRIPTION

The North Bay water treatment plant is a pumping station which partially treats water from Trout Lake. The process consists of alkalinity adjustment, fluoridation and disinfection. This plant has a rated capacity of 22.5 x 1000 m^3/day. The North Bay water treatment plant serves a population of approximately 50,000.

The sample day flows ranged from 24.3 x 1000 m^3/day to 45.0 x 1000 m^3/day.

General plant information is presented in Table 1 and a schematic of plant processes, chemical addition points and sampling locations in Figure 1.

SAMPLING AND ANALYSES

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained, a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples were used to make an assessment of the change in the levels of inorganic compounds and metals, due to leaching from, or deposition on, the plumbing system. The only analyses carried out on the standing samples therefore, were General Chemistry and Metals. The free flow

sample represented fresh water from the distribution main, since the sample tap was flushed for five minutes prior to sampling.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. Retention time was calculated by dividing the volume of water between two sampling points by sample day flow. For example, if it was determined that retention time within the plant was five hours, then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner (see Appendix B).

Plant operating personnel routinely analyze parameters for process control (Table 2).

Water at the plant and at two locations in the distribution system was sampled for the presence of approximately 180 parameters. Parameters were divided into the following groups: bacteriological, inorganic and physical (laboratory chemistry, field chemistry and metals), and organic (chloroaromatics, chlorophenols, pesticides and PCB, phenolics, polyaromatic hydrocarbons, specific pesticides and volatiles). Samples were analyzed for specific pesticides and chlorophenols twice a year in the spring and fall. Laboratory analyses were conducted at the Ministry of the Environment facilities in Rexdale, Ontario.

RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP database as submitted by plant personnel.

Table 3 contains information on delay time between raw and treated water sampling, flow rate, and treatment chemical dosages.

Table 4 is a summary break-down of the number of water samples analyzed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on Tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

GENERAL

Water quality was judged by comparison with the Ontario Drinking Water Objectives publication (ODWOs). When an Ontario Drinking Water Objective (ODWO) was not available, guidelines/limits from other agencies were used. These guidelines were obtained from the Parameter Listing System database.

IN THIS REPORT, DISCUSSION IS LIMITED TO:

- **THE TREATED AND DISTRIBUTED WATER;**
- **ONLY THOSE PARAMETERS WITH CONCENTRATIONS ABOVE GUIDELINE VALUES; AND**
- **POSITIVE ORGANIC PARAMETERS DETECTED.**

BACTERIOLOGICAL

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality. Routine monitoring programs usually require that multiple samples be collected in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples.

Standard plate count was the only bacteriological analysis conducted on the treated and distributed water. No results were reported above the guideline.

INORGANIC & PHYSICAL

CHEMISTRY (LAB)

Alkalinity was below the ODWO Aesthetic or Recommended Operational Guideline of 30-500 mg/L in all 32 treated and distributed water samples and ranged from 16.6 mg/L to 27.5 mg/L.

Colour in drinking water may be due to the presence of natural or synthetic substances as well as certain metallic ions.

Colour exceeded the ODWO Maximum Desirable Concentration of 5 HZU in 15 of 32 treated and distributed water samples with a maximum reported value of 8.0 HZU.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO Maximum Acceptable Concentration for turbidity is 1.0 Formazin Turbidity Units (FTU).

The laboratory turbidity exceeded the Maximum Acceptable Concentration in 1 treated water sample with a reported value of 1.4 FTU but this was not confirmed by the field turbidity which was considered to be more reliable.

METALS

Results of the metals scan showed that none were reported above the guidelines.

It should be noted, however, that lead values were usually above the limit in the distribution overnight standing samples, indicating that household taps should be flushed well before the water is used for consumption.

ORGANIC

CHLOROAROMATICS

The results of the chloroaromatic scan showed that none were detected above trace levels in the treated and distributed water.

CHLOROPHENOLS

The results of the chlorophenol scan showed that 2,4,6-trichlorophenol was detected at trace levels in the two treated water samples analyzed.

POLYAROMATIC HYDROCARBONS (PAH)

The results of the PAH scan showed that none were detected.

PESTICIDES & PCB

The results of the PCB scan showed that none were detected.

The results of the regular pesticide scan showed that none were detected above trace levels.

PHENOLICS

Phenolic compounds are present in the aquatic environment as a result of natural and/or industrial processes. The ODWOs recommend, as an operational guideline, that phenolic substances in drinking water not exceed 2.0 ug/L. This limit has been set primarily to prevent undesirable taste and odours, particularly in chlorinated water. No results were reported above trace levels.

SPECIFIC PESTICIDES

The results of the specific pesticides scan showed that none were detected.

VOLATILES

The detection of benzene, ethylbenzene, toluene and xylenes at low, trace levels may be a laboratory artifact derived from the analytical methodology.

Trihalomethanes (THMs) are produced during the water treatment process and will always occur in chlorinated waters. THMs are comprised of chloroform, chlorodibromomethane and dichlorobromomethane; bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs. Only total THMs results are discussed.

Total THMs were found at positive levels in the 31 treated and distributed water samples analyzed with a maximum level of 67.8 ug/L. This was below the ODWO Maximum Acceptable Concentration of 350 ug/L.

CONCLUSIONS

The North Bay water treatment plant, for the sample year 1990, produced good quality water and this was maintained in the distribution system.

No known health related guidelines were exceeded.

The detection of elevated lead in the standing samples in the distribution system would indicate that household taps should be flushed well before the water is used for consumption.

The current MOE policy (#15-14-01) requires that surface waters be provided with a minimum treatment which includes coagulation, flocculation, filtration and disinfection. This was not provided by the North Bay treatment facility.

FIGURE 1

NORTH BAY WTP

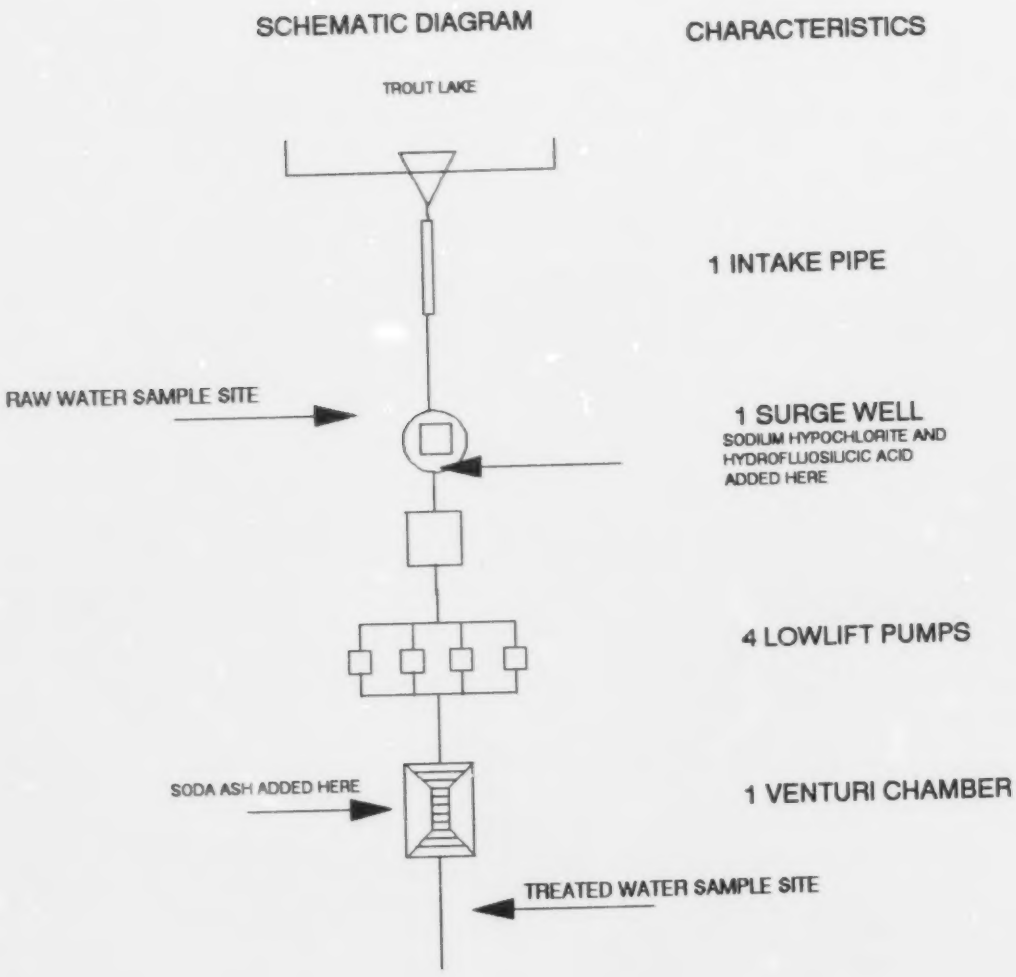

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM

PLANT GENERAL REPORT

WORKS #:	220000460
PLANT NAME:	NORTH BAY WTP
DISTRICT:	NORTH BAY
REGION:	NORTHEAST
DISTRICT OFFICER:	J. HARMAR
UTM #:	176225805131430
PLANT SUPERINTENDENT:	BUD WINTON
ADDRESS:	248 LAKESIDE DRIVE NORTH BAY, ONT P1B 3E3 (705)474-3417
MUNICIPALITY:	NORTH BAY
AUTHORITY:	MUNICIPAL

PLANT INFORMATION

PLANT VOLUME:	-	(X 1000 M3)
DESIGN CAPACITY:	24.000	(X 1000 M3/DAY)
RATED CAPACITY:	22.500	(X 1000 M3/DAY)

MUNICIPALITY	POPULATION
NORTH BAY	50,000

TABLE 2
DRINKING WATER SURVEILLANCE PROGRAM
IN-PLANT MONITORING

PARAMETER	LOCATION	FREQUENCY
FREE CHLORINE RESIDUAL	TREATED WATER IN LAB TREATED WATER	EVERY 8 HOURS CONTINUOUS
TOTAL CHLORINE RESIDUAL	TREATED WATER IN LAB	EVERY 8 HOURS
FLUORIDE	TREATED WATER	T 8 HR
PH	TREATED WATER	CONTINUOUS
TEMPERATURE	RAW WATER	CONTINUOUS
TURBIDITY	RAW WATER	CONTINUOUS

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP SAMPLE DAY CONDITIONS FOR 1990

			TREATMENT CHEMICAL DOSAGE (MG/L)		
			PRE CHLORINATION	FLUORIDATION	ALKALINITY ADJUST
			CHLORINE	HYDROFLUOSILICIC ACID	SODIUM CARBONATE
DATE	DELAY * TIME(HRS)	FLOW (1000M3)			
JAN 23	.25	28.460	1.91	1.23	7.48
FEB 27	.25	29.030	1.67	1.19	7.09
MAR 27	.25	29.180	2.03	1.22	8.27
APR 24	.25	33.120	1.72	1.20	7.50
MAY 29	.25	30.560	1.71	1.21	6.04
JUN 26	.25	31.560	2.15	1.23	7.23
JUL 24	.12	30.000	1.82	1.20	7.15
AUG 28	.25	44.960	1.89	1.35	12.00
SEP 25	.25	28.420	1.87	1.19	12.24
OCT 18	.25	30.770	1.75	1.23	9.69
NOV 27	.25	24.290	1.96	1.25	5.55
DEC 11	.00	.000	1.70	1.29	7.88

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL												
FECAL COLIFORM MF	11	3	0	.	.	.	.	.	.	.	.	.
STANDRD PLATE CNT MF	.	.	.	11	1	0	10	9	0	8	1	0
TOTAL COLIFORM MF	11	7	0	.	.	.	.	.	.	.	.	.
T COLIFORM BCKGRD MF	11	10	0	.	.	.	.	.	.	.	.	.
*TOTAL GROUP BACTERIOLOGICAL	33	20	0	11	1	0	10	9	0	8	1	0
CHEMISTRY (FLD)												
FLD CHLORINE (COMB)	1	1	0	12	12	0	19	15	0	18	17	0
FLD CHLORINE FREE	1	1	0	12	12	0	22	22	0	18	18	0
FLD CHLORINE (TOTAL)	1	1	0	12	12	0	22	22	0	18	18	0
FLD PH	12	12	0	12	12	0	22	22	0	18	18	0
FLD TEMPERATURE	12	12	0	12	12	0	22	22	0	17	17	0
FLD TURBIDITY	12	12	0	9	9	0	.	.	.	.	.	.
*TOTAL SCAN CHEMISTRY (FLD)	39	39	0	69	69	0	107	103	0	89	88	0
CHEMISTRY (LAB)												
ALKALINITY	12	12	0	12	12	0	22	22	0	17	17	0
CALCIUM	12	12	0	12	12	0	22	22	0	18	18	0
CYANIDE	12	0	0	12	0	0	.	.	.	.	.	.
CHLORIDE	12	12	0	12	12	0	22	22	0	18	18	0
COLOUR	12	12	0	12	12	0	22	22	0	18	17	1
CONDUCTIVITY	12	12	0	12	12	0	22	22	0	17	17	0
DISS ORG CARBON	12	12	0	12	12	0	22	22	0	18	18	0
FLUORIDE	12	12	0	12	12	0	22	22	0	18	18	0
HARDNESS	12	12	0	12	12	0	22	22	0	18	18	0
IONCAL	12	12	0	12	12	0	22	22	0	18	17	0
LANGELIERS INDEX	12	12	0	12	12	0	22	22	0	17	17	0
MAGNESIUM	12	12	0	12	12	0	22	22	0	18	18	0
SODIUM	12	12	0	12	12	0	22	22	0	18	18	0
AMMONIUM TOTAL	12	4	4	12	1	4	22	7	6	17	9	3
NITRITE	12	4	7	12	2	9	22	4	16	17	2	15
TOTAL NITRATES	12	12	0	12	12	0	22	22	0	17	17	0
NITROGEN TOT KJELD	12	12	0	12	12	0	22	22	0	18	18	0
PH	12	12	0	12	12	0	22	22	0	17	17	0
PHOSPHORUS FIL REACT	12	2	3	12	3	6	.	.	.	.	.	.
PHOSPHORUS TOTAL	12	0	11	12	4	7	.	.	.	.	.	.
SULPHATE	12	12	0	12	12	0	22	22	0	17	17	0
TURBIDITY	12	12	0	12	12	0	22	22	0	18	18	0
*TOTAL SCAN CHEMISTRY (LAB)	252	202	25	252	202	26	396	363	22	317	292	19

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS												
SILVER	12	0	0	12	0	0	22	1	1	18	0	0
ALUMINUM	12	12	0	12	12	0	22	22	0	18	18	0
ARSENIC	12	0	6	12	0	12	22	0	21	18	0	18
BARIUM	12	12	0	12	12	0	22	22	0	18	18	0
BORON	12	0	12	12	0	12	22	0	22	18	0	18
BERYLLIUM	12	0	0	12	0	0	22	0	0	18	0	1
CADMIUM	12	0	1	12	0	0	22	0	10	18	0	6
COBALT	12	0	11	12	0	12	22	1	21	18	0	17
CHROMIUM	12	0	5	12	0	4	22	0	9	18	0	3
COPPER	12	0	12	12	1	11	22	22	0	18	18	0
IRON	12	0	11	12	0	12	22	21	1	18	0	18
MERCURY	12	0	1	12	2	2	1	0	0	.	.	.
MANGANESE	12	11	1	12	11	0	22	22	0	18	17	1
MOLYBDENUM	12	0	9	12	1	10	22	0	11	18	0	7
NICKEL	12	0	12	12	0	11	22	8	14	18	8	10
LEAD	12	0	10	12	0	12	22	22	0	18	17	1
ANTIMONY	12	3	9	12	5	7	22	13	9	18	6	12
SELENIUM	12	0	1	12	0	2	22	0	0	18	0	1
STRONTIUM	12	12	0	12	12	0	22	22	0	18	18	0
TITANIUM	12	2	10	12	3	9	22	2	20	18	2	16
THALLIUM	12	0	2	12	0	1	22	0	4	18	0	1
URANIUM	12	0	0	12	0	1	22	0	1	18	0	1
VANADIUM	12	0	6	12	0	7	22	0	7	18	0	12
ZINC	12	12	0	12	11	1	22	22	0	18	18	0
*TOTAL SCAN METALS	288	64	119	288	70	126	507	200	151	414	140	143
*TOTAL GROUP INORGANIC & PHYSICAL	579	305	144	609	341	152	1010	666	173	820	520	162
CHLOROAROMATICS												
HEXACHLOROBUTADIENE	12	0	0	11	0	0	11	0	0	9	0	0
123 TRICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1234 T-CHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1235 T-CHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
124 TRICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1245 T-CHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
135 TRICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
HCB	12	0	0	11	0	0	11	0	0	9	0	0
HEXACHLOROETHANE	12	0	0	11	0	0	11	0	0	9	0	0
OCTACHLOROSTYRENE	12	0	0	11	0	0	11	0	0	9	0	0
PENTACHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
236 TRICHLOROTOLUENE	12	0	0	11	0	0	11	0	0	9	0	0
245 TRICHLOROTOLUENE	12	0	0	11	0	0	11	0	1	9	0	0
26A TRICHLOROTOLUENE	12	0	0	11	0	0	11	0	0	9	0	0
*TOTAL SCAN CHLOROAROMATICS	168	0	0	154	0	0	154	0	1	126	0	0

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
CHLOROPHENOLS												
234 TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
2345 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
2356 T-CHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
245-TRICHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
246-TRICHLOROPHENOL	2	0	0	2	0	2	.	.	.	.	.	.
PENTACHLOROPHENOL	2	0	0	2	0	0	.	.	.	.	.	.
*TOTAL SCAN CHLOROPHENOLS	12	0	0	12	0	2	0	0	0	0	0	0
PAH												
PHENANTHRENE	12	0	0	11	0	0	1	0	0	1	0	0
ANTHRACENE	11	0	0	10	0	0	1	0	0	1	0	0
FLUORANTHENE	12	0	0	11	0	0	1	0	0	1	0	0
PYRENE	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(A)ANTHRACENE	12	0	0	11	0	0	1	0	0	1	0	0
CHRYSENE	12	0	0	11	0	0	1	0	0	1	0	0
DIMETH. BENZ(A)ANTHR	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(E) PYRENE	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(B) FLUORANTHEN	12	0	0	11	0	0	1	0	0	1	0	0
PERYLENE	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(K) FLUORANTHEN	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(A) PYRENE	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(G,H,I) PERYLEN	12	0	0	11	0	0	1	0	0	1	0	0
DIBENZO(A,H) ANTHRAC	12	0	0	11	0	0	1	0	0	1	0	0
INDENO(1,2,3-C,D) PY	12	0	0	11	0	0	1	0	0	1	0	0
BENZO(B) CHRYSENE	12	0	0	11	0	0	1	0	0	1	0	0
CORONENE	12	0	0	11	0	0	1	0	0	1	0	0
*TOTAL SCAN PAH	203	0	0	186	0	0	17	0	0	17	0	0
PESTICIDES & PCB												
ALDRIN	12	0	0	11	0	0	11	0	0	9	0	0
ALPHA BHC	12	0	7	11	0	9	11	0	10	9	0	5
BETA BHC	12	0	0	11	0	0	11	0	0	9	0	0
LINDANE	12	0	0	11	0	0	11	0	0	9	0	0
ALPHA CHLORDANE	12	0	0	11	0	0	11	0	0	9	0	0
GAMMA CHLORDANE	12	0	0	11	0	0	11	0	0	9	0	0
DIELDRIN	12	0	0	11	0	0	11	0	0	9	0	0
METHOXYCHLOR	12	0	0	11	0	0	11	0	0	9	0	0
ENDOSULFAN 1	12	0	0	11	0	0	11	0	0	9	0	0
ENDOSULFAN II	12	0	0	11	0	0	11	0	0	9	0	0
ENDRIN	12	0	0	11	0	0	11	0	0	9	0	0
ENDOSULFAN SULPHATE	12	0	0	11	0	0	11	0	0	9	0	0
HEPTACHLOR EPOXIDE	12	0	0	11	0	1	11	0	0	9	0	0
HEPTACHLOR	12	0	0	11	0	0	11	0	0	9	0	0
MIREX	12	0	0	11	0	0	11	0	0	9	0	0
OXYCHLORDANE	12	0	0	11	0	0	11	0	0	9	0	0
OPDDT	12	0	0	11	0	0	11	0	0	9	0	0
PCB	12	0	0	11	0	0	11	0	0	9	0	0
DDD	12	0	0	11	0	0	11	0	0	9	0	0
PPDDE	12	0	0	11	0	0	11	0	0	9	0	0

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PPDDT	12	0	0	11	0	0	11	0	0	9	0	0
AMETRINE	11	0	0	12	0	0	.	.	.	.	.	.
ATRAZINE	11	0	0	12	0	0	.	.	.	.	.	.
ATRATONE	11	0	0	12	0	0	.	.	.	.	.	.
CYANAZINE (BLADEX)	11	0	0	12	0	0	.	.	.	.	.	.
DESETHYLATRAZINE	11	0	0	12	0	0	.	.	.	.	.	.
D-ETHYL SIMAZINE	11	0	0	12	0	0	.	.	.	.	.	.
PROMETONE	11	0	0	12	0	0	.	.	.	.	.	.
PROPAZINE	11	0	0	12	0	0	.	.	.	.	.	.
PROMETRYNE	11	0	0	12	0	0	.	.	.	.	.	.
METRIBUZIN (SENCOR)	10	0	0	11	0	0	.	.	.	.	.	.
SIMAZINE	11	0	0	12	0	0	.	.	.	.	.	.
ALACHLOR (LASSO)	11	0	0	12	0	0	.	.	.	.	.	.
METOLACHLOR	11	0	0	12	0	0	.	.	.	.	.	.
HEXACLCYCLOPENTADIEN	3	0	0	2	0	0	3	0	0	1	0	0
*TOTAL SCAN PESTICIDES & PCB	397	0	7	388	0	10	234	0	10	190	0	5
PHENOLICS												
PHENOLICS	12	0	5	12	0	7	.	.	.	.	.	.
*TOTAL SCAN PHENOLICS	12	0	5	12	0	7	0	0	0	0	0	0
SPECIFIC PESTICIDES												
TOXAPHENE	12	0	0	11	0	0	11	0	0	9	0	0
2,4,5-T	2	0	0	2	0	0	.	.	.	.	.	.
2,4-D	2	0	0	2	0	0	.	.	.	.	.	.
2,4-DB	2	0	0	2	0	0	.	.	.	.	.	.
2,4 D PROPIONIC ACID	2	0	0	2	0	0	.	.	.	.	.	.
DICAMBA	2	0	0	2	0	0	.	.	.	.	.	.
PICHLORAM	0	0	0	0	0	0	.	.	.	.	.	.
SILVEX	2	0	0	2	0	0	.	.	.	.	.	.
DIAZINON	2	0	0	2	0	0	.	.	.	.	.	.
DICHLOROVOS	2	0	0	2	0	0	.	.	.	.	.	.
CHLORPYRIFOS	2	0	0	2	0	0	.	.	.	.	.	.
ETHION	2	0	0	2	0	0	.	.	.	.	.	.
AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.	.	.	.
MALATHION	2	0	0	2	0	0	.	.	.	.	.	.
MEVINPHOS	2	0	0	2	0	0	.	.	.	.	.	.
METHYL PARATHION	2	0	0	2	0	0	.	.	.	.	.	.
METHYLTRITHION	2	0	0	2	0	0	.	.	.	.	.	.
PARATHION	2	0	0	2	0	0	.	.	.	.	.	.
PHORATE	2	0	0	2	0	0	.	.	.	.	.	.
RELDAN	2	0	0	2	0	0	.	.	.	.	.	.
RONNEL	2	0	0	2	0	0	.	.	.	.	.	.
AMINOCARB	0	0	0	0	0	0	.	.	.	.	.	.
BENOMYL	0	0	0	0	0	0	.	.	.	.	.	.
BUX	0	0	0	0	0	0	.	.	.	.	.	.
CARBOFURAN	2	0	0	2	0	0	.	.	.	.	.	.
CICP	2	0	0	2	0	0	.	.	.	.	.	.
DIALLATE	2	0	0	2	0	0	.	.	.	.	.	.

TABLE 4
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP
SUMMARY TABLE OF RESULTS (1990)

SCAN PARAMETER	RAW			TREATED			SITE 1			SITE 3		
	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
EPTAM	2	0	0	2	0	0	.	.	.	.	.	.
IPC	2	0	0	2	0	0	.	.	.	.	.	.
PROPOXUR	2	0	0	2	0	0	.	.	.	.	.	.
CARBARYL	2	0	0	2	0	0	.	.	.	.	.	.
BUTYLATE	2	0	0	2	0	0	.	.	.	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES	64	0	0	63	0	0	11	0	0	9	0	0
VOLATILES												
BENZENE	12	0	0	11	0	5	11	0	2	9	0	1
TOLUENE	12	0	0	11	0	1	11	0	0	9	0	1
ETHYLBENZENE	12	0	1	11	0	6	11	0	5	9	0	5
P-XYLENE	12	0	0	11	0	0	11	0	0	9	0	0
M-XYLENE	12	0	0	11	0	0	11	0	0	9	0	0
O-XYLENE	12	0	0	11	0	0	11	0	0	9	0	0
STYRENE	12	0	1	11	0	6	11	0	6	9	0	5
1,1 DICHLOROETHYLENE	12	0	0	11	0	0	11	0	0	9	0	0
METHYLENE CHLORIDE	12	0	0	11	0	0	11	0	0	9	0	0
T1,2DICHLOROETHYLENE	12	0	0	11	0	0	11	0	0	9	0	0
1,1 DICHLOROETHANE	12	0	0	11	0	0	11	0	0	9	0	0
CHLOROFORM	12	0	0	11	11	0	11	11	0	9	9	0
111, TRICHLOROETHANE	12	0	0	11	0	0	11	0	1	9	0	1
1,2 DICHLOROETHANE	12	0	0	11	0	0	11	0	0	9	0	0
CARBON TETRACHLORIDE	12	0	0	11	0	0	11	0	0	9	0	0
1,2 DICHLOROPROPANE	12	0	0	11	0	0	11	0	0	9	0	0
TRICHLOROETHYLENE	12	0	0	11	0	0	11	0	0	9	0	0
DICHLOROBROMOMETHANE	12	0	0	11	11	0	11	11	0	9	9	0
112 TRICHLOROETHANE	12	0	0	11	0	0	11	0	0	9	0	0
CHLORODIBROMOMETHANE	12	0	0	11	0	11	11	0	11	9	0	9
T-CHLOROETHYLENE	12	0	0	11	0	0	11	0	0	9	0	0
BROMOFORM	12	0	0	11	0	0	11	0	0	9	0	0
1122 T-CHLOROETHANE	12	0	0	11	0	0	11	0	0	9	0	0
CHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1,4 DICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1,3 DICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
1,2 DICHLOROBENZENE	12	0	0	11	0	0	11	0	0	9	0	0
ETHLYENE DIBROMIDE	12	0	0	11	0	0	11	0	0	9	0	0
TOTL TRIHALOMETHANES	12	0	0	11	11	0	11	11	0	9	9	0
*TOTAL SCAN VOLATILES	348	0	2	319	33	29	319	33	25	261	27	22
*TOTAL GROUP ORGANIC	1204	0	14	1134	33	48	735	33	36	603	27	27

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
2. Interim Maximum Acceptable Concentration (IMAC)
3. Aesthetic Objective (AO)
3*. AO for Total Xylenes
4. Recommended Operational Guideline

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria
4T. EPA Ambient Water Quality Criteria for Total PAH

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurement Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!IV	No Data: Inverted Septum
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded
!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!PE	No Data: Procedural Error - Sample Discarded
!PH	No Data: Sample pH Outside Valid Range
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
ASC	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRD	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant

UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminate Interference
XP	Positive After X Number Of Hours
T#	(T06) Result Taken After # Hours

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		SITE 3
			STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL						
FECAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 0 (A1)		
JAN	1	.	.	.	.	.
FEB	0	.	.	.	.	.
MAR	0	.	.	.	.	.
MAY	BDL	.	.	.	.	.
JUN	BDL	.	.	.	.	.
JUL	BDL	.	.	.	.	.
AUG	BDL	.	.	.	.	.
SEP	2	.	.	.	.	.
OCT	0	.	.	.	.	.
NOV	0	.	.	.	.	.
DEC	1	.	.	.	.	.
STANDRD PLATE CNT MF (COUNT/ML)		DET'N LIMIT = 0		GUIDELINE = 500/ML (A3)		
JAN	.	2 <=>	.	1 <=>	.	2 <=>
FEB	.	2 <=>	.	51	.	0 <=>
MAR	.	7 <=>	.	24	.	.
MAY	.	1 <=>	.	21	.	3 <=>
JUN	.	175	.	82	.	3 <=>
JUL	.	1 <=>	.	.	.	28
AUG	.	2 <=>	.	113	.	1 <=>
SEP	.	7 <=>	.	28	.	0 <=>
OCT	.	3 <=>	.	87	.	2 <=>
NOV	.	3 <=>	.	55	.	.
DEC	.	5 <=>	.	17	.	.
TOTAL COLIFORM MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = 5/100ML(A1)		
JAN	50	.	.	.	.	.
FEB	3	.	.	.	.	.
MAR	210	.	.	.	.	.
MAY	20 <=>	.	.	.	.	.
JUN	BDL	.	.	.	.	.
JUL	BDL	.	.	.	.	.
AUG	40	.	.	.	.	.
SEP	BDL	.	.	.	.	.
OCT	52	.	.	.	.	.
NOV	48	.	.	.	.	.
DEC	28	.	.	.	.	.
T COLIFORM BCKGRD MF (CT/100ML)		DET'N LIMIT = 0		GUIDELINE = N/A		
JAN	214	.	.	.	.	.
FEB	187	.	.	.	.	.
MAR	1700	.	.	.	.	.
MAY	50 <=>	.	.	.	.	.
JUN	2800	.	.	.	.	.
JUL	380	.	.	.	.	.
AUG	880	.	.	.	.	.
SEP	1040	.	.	.	.	.
OCT	540	.	.	.	.	.
NOV	196	.	.	.	.	.
DEC	164	.	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (FLD)						
FLD CHLORINE (COMB) (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
JAN	.	.040	.000	.150	.200	.200
FEB	.	.170	.050	.050	.100	.100
MAR	.110	.050	.050	.150	.	.
APR	.	.040	.	.150	.200	.100
MAY	.	.050	.150	.150	.100	.300
JUN	.	.050	.100	.100	.100	.000
JUL	.	.120	.	.	.100	.100
AUG	.	.150	.100	.100	.200	.200
SEP	.	.180	.	.	.100	.100
OCT	.	.090	.050	.050	.100	.100
NOV	.	.060	.050	.000	.	.
DEC	.	.200	.000	.000	.	.
FLD CHLORINE FREE (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
JAN	.	.720	.100	.200	.200	.200
FEB	.	.480	.250	.300	.200	.500
MAR	.840	.450	.150	.200	.	.
APR	.	.420	.200	.300	.100	.300
MAY	.	.450	.150	.250	.100	.300
JUN	.	.450	.150	.250	.100	.400
JUL	.	.820	.	.	.100	.200
AUG	.	.500	.200	.250	.200	.200
SEP	.	.420	.100	.150	.100	.100
OCT	.	.480	.100	.150	.200	.200
NOV	.	.420	.200	.250	.	.
DEC	.	.550	.150	.150	.	.
FLD CHLORINE (TOTAL) (MG/L)			DET'N LIMIT = 0	GUIDELINE = N/A		
JAN	.	.760	.100	.350	.400	.400
FEB	.	.650	.300	.350	.300	.600
MAR	.950	.500	.200	.350	.	.
APR	.	.460	.200	.450	.200	.400
MAY	.	.500	.300	.400	.200	.600
JUN	.	.500	.250	.350	.200	.400
JUL	.	.940	.	.	.200	.300
AUG	.	.650	.300	.350	.400	.400
SEP	.	.600	.100	.150	.200	.200
OCT	.	.570	.150	.200	.300	.300
NOV	.	.480	.250	.250	.	.
DEC	.	.750	.150	.150	.	.
FLD PH (DMNSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)		
JAN	6.900	7.140	7.000	7.200	7.300	7.400
FEB	6.850	7.230	7.200	7.200	7.100	7.100
MAR	6.900	7.220	7.300	7.300	.	.
APR	6.980	7.100	7.100	7.200	7.200	7.000
MAY	6.980	7.100	7.100	7.210	7.200	7.300
JUN	7.120	7.300	7.200	7.250	7.200	7.300
JUL	6.800	7.150	.	.	7.200	7.100
AUG	6.820	7.230	7.200	7.300	7.200	7.200
SEP	6.880	7.210	7.200	7.200	7.100	7.200
OCT	6.770	7.230	7.200	7.200	7.200	7.250
NOV	6.980	7.200	7.200	7.250	.	.
DEC	6.600	7.150	7.450	7.600	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
FLD TEMPERATURE (DEG.C)			DET'N LIMIT = N/A		GUIDELINE = 15 (A3)	
JAN	2.200	2.200	12.000	6.000	7.000	4.000
FEB	2.200	2.200	14.500	5.000	6.000	3.000
MAR	2.200	2.200	16.000	4.000	.	.
APR	7.000	7.000	16.000	7.000	9.000	6.000
MAY	6.200	6.200	12.000	8.000	10.000	8.000
JUN	4.200	4.400	15.000	10.000	12.000	.
JUL	8.000	8.000	.	.	14.000	10.000
AUG	5.500	5.500	18.000	10.000	13.000	12.000
SEP	9.700	9.700	18.000	11.000	14.000	12.000
OCT	5.500	5.500	19.000	11.000	14.000	11.000
NOV	2.770	2.770	17.000	9.000	.	.
DEC	1.100	1.100	17.300	7.300	.	.
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A		GUIDELINE = 1 (A1)	
JAN	.400	.	.	.	.	.
FEB	.350	.350	.	.	.	.
MAR	.340	.340	.	.	.	.
APR	.260	.	.	.	.	.
MAY	.300	.300	.	.	.	.
JUN	.480	.400	.	.	.	.
JUL	.480	.480	.	.	.	.
AUG	.590	.	.	.	.	.
SEP	.380	.380	.	.	.	.
OCT	.600	.600	.	.	.	.
NOV	.480	.480	.	.	.	.
DEC	.360	.360	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)						
ALKALINITY (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 30-500 (A3)	
JAN	13.700	18.900	19.700	18.900	18.800	18.600
FEB	14.100	19.500	21.300	20.600	20.800	20.100
MAR	13.900	20.400	21.900	20.900	.	.
APR	13.800	19.300	20.100	19.600	20.200	19.200
MAY	12.900	17.500	18.600	18.000	18.300	17.800
JUN	12.800	20.300	20.200	20.300	20.100	20.900
JUL	13.300	20.500	.	.	20.700	19.800
AUG	12.900	22.700	23.000	22.600	22.400	22.400
SEP	12.700	20.600	22.500	27.500	22.800	21.800
OCT	12.900	21.900	23.700	22.100	IUR	22.100
NOV	13.600	16.800	18.400	18.000	.	.
DEC	12.600	18.200	19.200	18.700	.	.
CALCIUM (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 100 (F2)	
JAN	7.700	7.400	7.600	7.800	8.000	7.900
FEB	6.800	7.400	8.000	7.000	7.200	7.200
MAR	7.000	7.200	7.800	7.600	.	.
APR	7.400	7.600	7.400	7.200	7.600	7.400
MAY	6.300	6.400	6.400	6.300	6.500	6.500
JUN	6.100	6.200	6.600	6.400	6.700	6.500
JUL	7.000	6.000	.	.	6.700	6.500
AUG	6.500	6.500	6.000	5.600	6.100	5.900
SEP	7.200	7.400	7.800	7.800	7.800	8.000
OCT	6.110	6.300	6.900	7.000	7.200	6.900
NOV	7.000	6.900	6.600	7.000	.	.
DEC	6.200	6.600	7.600	7.400	.	.
CHLORIDE (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 250 (A3)	
JAN	16.400	17.700	18.300	18.000	17.900	17.900
FEB	19.100	19.800	20.300	19.800	20.200	19.600
MAR	20.000	21.500	21.900	22.100	.	.
APR	17.400	18.900	18.800	18.700	19.600	17.400
MAY	13.300	14.600	15.000	14.900	14.900	14.800
JUN	13.200	14.800	15.200	15.100	15.400	15.200
JUL	13.500	14.500	.	.	13.800	13.500
AUG	12.300	13.700	14.500	14.400	14.300	14.300
SEP	13.300	14.400	15.100	14.800	15.500	15.100
OCT	14.000	14.300	14.100	14.100	14.700	14.700
NOV	12.400	14.000	14.600	14.700	.	.
DEC	12.900	14.200	14.800	14.700	.	.
COLOUR (HZU)			DET'N LIMIT = 0.5		GUIDELINE = 5 (A3)	
JAN	6.000	4.000	6.000	6.500	4.500	4.500
FEB	7.500	4.500	6.000	6.500	4.000	5.000
MAR	8.000	5.000	5.500	8.000	.	.
APR	7.500	4.000	5.500	6.500	4.500	5.000
MAY	8.000	4.500	6.000	6.500	5.000	5.000
JUN	8.000	5.000	6.500	6.000	5.500	6.500
JUL	7.500	5.000	.	.	5.000	6.000
AUG	8.000	5.000	5.500	6.000	5.500	5.000
SEP	6.500	4.500	5.000	5.500	4.000	4.500
OCT	7.500	5.500	6.000	4.500	9.000 <T	4.500
NOV	11.000	5.500	7.000	8.000	.	.
DEC	9.500	6.500	8.000	7.000	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CONDUCTIVITY (UMHO/CM)			DET'N LIMIT = 1.		GUIDELINE = 400 (F2)	
JAN	108	129	132	128	129	128
FEB	120	140	148	143	145	141
MAR	125	149	155	150	.	.
APR	113	135	136	135	140	129
MAY	97	115	118	116	118	117
JUN	96	119	121	120	122	121
JUL	97	120	.	.	122	119
AUG	96	124	126	124	126	125
SEP	96	120	124	134	127	124
OCT	98	124	128	126	IUR	126
NOV	99	115	117	116	.	.
DEC	97	117	121	119	.	.
DISS ORG CARBON (MG/L)			DET'N LIMIT = .100		GUIDELINE = 5.0 (A3)	
JAN	3.300	3.100	3.300	3.000	3.200	3.100
FEB	2.700	2.700	2.600	2.600	2.700	2.700
MAR	3.000	3.000	2.900	2.900	.	.
APR	3.000	3.100	2.800	2.900	3.300	3.100
MAY	3.000	3.100	3.000	2.900	3.100	3.100
JUN	3.000	3.000	3.000	2.700	3.000	3.000
JUL	2.800	2.900	.	.	3.000	3.000
AUG	2.800	2.800	2.700	2.800	3.000	2.700
SEP	2.600	2.800	2.600	2.500	2.900	2.900
OCT	2.000	2.900	3.200	2.100	3.600	4.100
NOV	3.200	3.300	2.900	2.900	.	.
DEC	3.200	3.200	2.800	2.900	.	.
FLUORIDE (MG/L)			DET'N LIMIT = 0.01		GUIDELINE = 2.4 (A1)	
JAN	.060	1.120	1.140	1.140	1.140	1.140
FEB	.080	1.160	1.100	1.120	1.120	1.140
MAR	.080	1.220	1.220	1.200	.	.
APR	.100	1.140	1.180	1.180	1.220	1.220
MAY	.080	1.160	1.180	1.140	1.220	1.260
JUN	.100	1.100	1.200	1.200	1.240	1.160
JUL	.100	1.240	.	.	1.260	1.300
AUG	.080	1.380	1.400	1.420	1.440	1.440
SEP	.100	1.240	1.220	1.220	1.240	1.240
OCT	.080	1.320	1.340	1.320	1.320	1.360
NOV	.100	1.240	1.200	1.220	.	.
DEC	.080	1.160	1.160	1.140	.	.
HARDNESS (MG/L)			DET'N LIMIT = 0.5		GUIDELINE = 80-100 (A4)	
JAN	27.100	26.400	26.800	27.300	27.800	27.300
FEB	25.000	26.000	28.000	25.000	25.000	26.000
MAR	25.000	26.000	28.000	26.000	.	.
APR	26.000	27.000	26.000	26.000	28.000	26.000
MAY	22.800	23.300	23.300	22.800	23.600	23.300
JUN	22.500	22.500	23.300	23.200	24.200	22.900
JUL	24.500	22.200	.	.	22.700	22.500
AUG	23.100	23.400	22.300	20.800	22.300	22.000
SEP	25.000	26.000	27.000	27.000	27.000	27.000
OCT	22.800	23.200	23.800	24.200	24.400	23.800
NOV	24.600	24.200	23.200	24.200	.	.
DEC	22.600	23.500	26.000	26.000	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
IONCAL (DMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A	
JAN	5.611	10.370	6.653	8.580	10.480	10.690
FEB	2.876	2.725	2.299	.163	1.446	.692
MAR	4.415	3.749	1.200	4.242	.	.
APR	.107	6.848	6.142	6.773	5.705	6.892
MAY	2.461	3.541	2.099	4.631	4.824	4.797
JUN	2.378	3.064	2.709	5.197	3.753	3.905
JUL	2.169	3.136	.	.	2.919	6.570
AUG	.295	6.219	6.008	5.518	7.494	7.153
SEP	1.828	10.180	6.478	2.232	8.421	9.754
OCT	1.788	6.027	7.919	12.480	.000	9.409
NOV	6.238	9.429	4.698	7.817	.	.
DEC	2.358	5.446	10.990	11.890	.	.
LANGELIERS INDEX (DMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = N/A	
JAN	-1.998	-1.775	-1.787	-1.692	-1.763	-1.743
FEB	-2.105	-1.716	-1.618	-1.648	-1.672	-1.696
MAR	-2.191	-1.713	-1.650	-1.669	.	.
APR	-1.974	-1.677	-1.701	-1.714	-1.719	-1.668
MAY	-2.096	-1.785	-1.740	-1.750	-1.760	-1.752
JUN	-2.053	-1.546	-1.552	-1.563	-1.578	-1.514
JUL	-1.997	-1.577	.	.	-1.655	-1.677
AUG	-2.132	-1.579	-1.649	-1.676	-1.644	-1.658
SEP	-2.115	-1.593	-1.594	-1.011	-1.460	-1.487
OCT	-2.130	-1.619	-1.537	-1.600	.	-1.646
NOV	-2.008	-1.880	-1.711	-1.684	.	.
DEC	-2.163	-1.806	-1.653	-1.645	.	.
MAGNESIUM (MG/L)			DET'N LIMIT = 0.10		GUIDELINE = 30 (F2)	
JAN	1.950	1.950	1.900	1.900	1.900	1.850
FEB	1.900	1.900	1.900	1.900	1.800	1.900
MAR	1.800	1.900	1.900	1.900	.	.
APR	1.900	1.900	2.000	2.000	2.100	1.900
MAY	1.750	1.750	1.750	1.750	1.750	1.700
JUN	1.800	1.700	1.650	1.750	1.850	1.650
JUL	1.700	1.750	.	.	1.450	1.550
AUG	1.700	1.700	1.750	1.650	1.750	1.750
SEP	1.800	1.900	1.800	1.800	1.800	1.800
OCT	1.830	1.810	1.550	1.650	1.600	1.600
NOV	1.700	1.700	1.650	1.650	.	.
DEC	1.700	1.700	1.700	1.800	.	.
SODIUM (MG/L)			DET'N LIMIT = 0.2		GUIDELINE = 200 (A4)	
JAN	9.900	14.800	14.600	14.200	14.400	14.600
FEB	12.000	15.600	16.400	15.600	15.800	15.400
MAR	12.000	17.600	17.800	17.800	.	.
APR	10.400	15.400	15.600	15.600	15.800	14.600
MAY	8.100	12.100	12.500	12.800	12.900	12.600
JUN	8.100	13.800	13.700	14.100	13.600	14.400
JUL	8.400	13.700	.	.	13.200	13.300
AUG	7.800	14.600	15.500	15.700	15.400	15.500
SEP	7.600	13.400	13.800	13.600	14.800	14.000
OCT	9.500	14.730	15.700	15.800	15.500	15.700
NOV	8.600	12.200	12.700	12.200	.	.
DEC	7.800	12.400	13.400	13.400	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002	GUIDELINE = 0.05 (F2)		
JAN	.010	BDL	.006 <T	BDL	.036	BDL
FEB	.008 <T	BDL	.074	BDL	.026	BDL
MAR	BDL	BDL	.010	BDL	.	.
APR	.014	.010	.038	.018	.056	.010
MAY	BDL	BDL	.006 <T	BDL	.014	BDL
JUN	BDL	BDL	.004 <T	BDL	.016	BDL
JUL	.004 <T	BDL	.	.	.028	.008 <T
AUG	.004 <T	.008 <T	.012	.008 <T	.046	.008 <T
SEP	BDL	BDL	BDL	BDL	.028	BDL
OCT	.012	.006 <T	.002 <T	BDL	IUR	.008 <T
NOV	.016	.006 <T	.012	.022	.	.
DEC	.006 <T	.004 <T	.006 <T	BDL	.	.
NITRITE (MG/L)			DET'N LIMIT = 0.001	GUIDELINE = 1 (A1)		
JAN	.005	.001 <T	.002 <T	.001 <T	.002 <T	.002 <T
FEB	.002 <T	.001 <T	.002 <T	.001 <T	.002 <T	.001 <T
MAR	.011	.003 <T	.003 <T	.002 <T	.	.
APR	.003 <T	.001 <T	.001 <T	.002 <T	.002 <T	.001 <T
MAY	.003 <T	.001 <T	.002 <T	.001 <T	.003 <T	.001 <T
JUN	.010	.010	.015	.012	.013	.018
JUL	.003 <T	.001 <T	.	.	.003 <T	.003 <T
AUG	.001 <T	.001 <T	.003 <T	.002 <T	.002 <T	.001 <T
SEP	BDL	.002 <T	BDL	BDL	.004 <T	.002 <T
OCT	.001 <T	.001 <T	.002 <T	.001 <T	IUR	.001 <T
NOV	.009	.007	.009	.016	.	.
DEC	.001 <T	BDL	.003 <T	.001 <T	.	.
TOTAL NITRATES (MG/L)			DET'N LIMIT = 0.005	GUIDELINE = 10 (A1)		
JAN	.275	.270	.300	.270	.335	.290
FEB	.305	.300	.710	.300	.340	.300
MAR	.345	.330	.750	.335	.	.
APR	.345	.340	.385	.355	.455	.335
MAY	.265	.265	.285	.260	.295	.270
JUN	.285	.275	.335	.270	.320	.285
JUL	.310	.300	.	.	.350	.305
AUG	.295	.300	.315	.290	.380	.300
SEP	.295	.290	.300	.285	.335	.295
OCT	.305	.295	.310	.300	IUR	.300
NOV	.230	.225	.240	2.060	.	.
DEC	.225	.235	.255	.260	.	.
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = 0.02	GUIDELINE = N/A		
JAN	.360	.270	.350	.260	.340	.240
FEB	.240	.240	.340	.220	.280	.230
MAR	.250	.230	.300	.240	.	.
APR	.200	.160	.200	.170	.350	.180
MAY	.200	.150	.260	.660	.520	.650
JUN	.200	.190	.200	.190	.310	.190
JUL	.210	.200	.	.	.310	.260
AUG	.160	.160	.180	.150	.220	.150
SEP	.170	.160	.220	.170	.270	.190
OCT	.180	.180	.180	.160	.390	.120
NOV	.230	.230	.210	.200	.	.
DEC	.210	.210	.180	.170	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PH (DIMNSLESS)			DET'N LIMIT = N/A		GUIDELINE = 6.5-8.5(A4)	
JAN	7.340	7.450	7.410	7.510	7.430	7.460
FEB	7.280	7.500	7.530	7.570	7.530	7.520
MAR	7.190	7.500	7.500	7.510	.	.
APR	7.380	7.530	7.500	7.510	7.470	7.550
MAY	7.350	7.530	7.550	7.560	7.530	7.550
JUN	7.410	7.720	7.690	7.690	7.660	7.720
JUL	7.390	7.700	.	.	7.570	7.580
AUG	7.300	7.620	7.580	7.590	7.590	7.590
SEP	7.280	7.590	7.530	8.030	7.660	7.640
OCT	7.330	7.610	7.620	7.580	IUR	7.540
NOV	7.370	7.420	7.570	7.580	.	.
DEC	7.300	7.480	7.550	7.580	.	.
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = 0.0005		GUIDELINE = N/A	
JAN	.003	.005	.	.	.	.
FEB	BDL	.008	.	.	.	.
MAR	BDL	.000 <T	.	.	.	.
APR	.000 <T	.008	.	.	.	.
MAY	.008	.001 <T	.	.	.	.
JUN	BDL	BDL	.	.	.	.
JUL	BDL	.001 <T	.	.	.	.
AUG	.000 <T	.001 <T	.	.	.	.
SEP	BDL	BDL	.	.	.	.
OCT	.000 <T	.001 <T	.	.	.	.
NOV	BDL	BDL	.	.	.	.
DEC	BDL	.002 <T	.	.	.	.
PHOSPHORUS TOTAL (MG/L)			DET'N LIMIT = 0.002		GUIDELINE = .40 (F2)	
JAN	.003 <T	.011	.	.	.	.
FEB	.003 <T	.012	.	.	.	.
MAR	.006 <T	.014	.	.	.	.
APR	.004 <T	.013	.	.	.	.
MAY	.009 <T	.007 <T	.	.	.	.
JUN	.004 <T	.006 <T	.	.	.	.
JUL	.004 <T	.005 <T	.	.	.	.
AUG	.002 <T	.004 <T	.	.	.	.
SEP	.005 <T	.006 <T	.	.	.	.
OCT	.005 <T	.007 <T	.	.	.	.
NOV	.004 <T	.004 <T	.	.	.	.
DEC	BDL	BDL	.	.	.	.
SULPHATE (MG/L)			DET'N LIMIT = .200		GUIDELINE = 500 (A3)	
JAN	8.070	8.010	8.000	7.990	8.040	8.160
FEB	9.850	9.720	9.430	9.330	9.790	9.660
MAR	9.500	9.460	9.400	9.190	.	.
APR	8.960	8.910	8.890	8.770	8.980	9.020
MAY	8.580	8.410	8.230	8.230	8.440	8.320
JUN	8.420	8.410	8.480	8.270	8.690	8.570
JUL	8.060	8.030	.	.	8.280	8.110
AUG	8.430	8.340	7.860	7.800	7.920	7.980
SEP	8.300	8.030	8.220	7.960	8.360	8.190
OCT	8.630	8.610	8.470	8.700	IUR	8.730
NOV	8.430	8.690	8.440	8.410	.	.
DEC	8.440	8.430	8.340	8.460	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
TURBIDITY (FTU)			DET'N LIMIT = 0.05	GUIDELINE = 1	(A1)	
JAN	3.600	1.000	1.600	.840	1.540	1.100
FEB	.560	.980	1.100	.920	1.300	1.000
MAR	1.000	1.400	1.400	1.100	.	.
APR	.660	.990	.900	.660	.700	.590
MAY	.370	.540	.730	.660	.730	.720
JUN	.630	.470	.580	.540	.710	.460
JUL	.500	.610	.	.	.860	.750
AUG	.450	.400	.800	.680	.570	.540
SEP	.420	.430	.650	.590	.740	.540
OCT	.360	.330	.610	.420	.390	.270
NOV	.760	.870	.750	.700	.	.
DEC	.770	.660	.660	.600	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
METALS						
SILVER (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 50 (A1)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	.060 <T	BDL	.	.
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	.890	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.
DEC	BDL	BDL	BDL	BDL	.	.
ALUMINUM (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 100 (A4)	
JAN	8.500	9.600	9.400	9.300	11.000	9.900
FEB	8.300	10.000	9.400	8.400	9.800	5.700
MAR	16.000	17.890	13.000	15.000	.	.
APR	19.000	21.000	19.000	19.000	25.000	23.000
MAY	21.000	21.000	20.000	18.000	23.000	28.000
JUN	14.000	14.000	15.000	67.000	16.000	16.000
JUL	13.000	14.000	.	.	14.000	15.000
AUG	13.000	14.000	13.000	12.000	15.000	9.100
SEP	12.000	12.000	8.600	9.500	11.000	15.000
OCT	4.300	11.000	10.000	14.000	12.000	11.000
NOV	15.000	15.000	15.000	15.000	.	.
DEC	15.000	3.700	18.000	18.000	.	.
ARSENIC (UG/L)			DET'N LIMIT = 0.10		GUIDELINE = 25 (A1)	
JAN	.120 <T	.750 <T	.410 <T	.450 <T	.420 <T	.640 <T
FEB	.170 <T	.590 <T	.330 <T	.400 <T	.570 <T	.610 <T
MAR	BDL	.480 <T	.300 <T	.520 <T	.	.
APR	.240 <T	.680 <T	.540 <T	.630 <T	.530 <T	.810 <T
MAY	BDL	.110 <T	.140 <T	.250 <T	.250 <T	.310 <T
JUN	BDL	.150 <T	.150 <T	.290 <T	.180 <T	.470 <T
JUL	.150 <T	.490 <T	.	.	.450 <T	.480 <T
AUG	BDL	.290 <T	.160 <T	.240 <T	.320 <T	.310 <T
SEP	.190 <T	.450 <T	.290 <T	.260 <T	.330 <T	.400 <T
OCT	.160 <T	.470 <T	.210 <T	.400 <T	.370 <T	.460 <T
NOV	BDL	.150 <T	BDL	.210 <T	.	.
DEC	BDL	.370 <T	.500 <T	.210 <T	.	.
BARIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 1000 (A2)	
JAN	17.000	16.000	17.000	16.000	17.000	17.000
FEB	17.000	17.000	19.000	16.000	17.000	16.000
MAR	17.900	18.000	18.000	16.000	.	.
APR	17.000	17.000	18.000	17.000	19.000	17.000
MAY	15.000	15.000	15.000	15.000	16.000	16.000
JUN	15.000	15.000	15.000	15.000	16.000	15.000
JUL	16.000	16.000	.	.	17.000	17.000
AUG	15.000	15.000	15.000	14.000	15.000	15.000
SEP	15.000	16.000	18.000	17.000	16.000	16.000
OCT	15.000	15.000	16.000	14.000	16.000	15.000
NOV	16.000	16.000	14.000	14.000	.	.
DEC	15.000	9.900	13.000	13.000	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
BORON (UG/L)			DET'N LIMIT = 2.00		GUIDELINE = 5000 (A1)	
JAN	9.600 <T	8.000 <T	12.000 <T	8.900 <T	8.600 <T	7.100 <T
FEB	7.700 <T	7.300 <T	8.400 <T	8.700 <T	9.400 <T	9.600 <T
MAR	8.600 <T	8.360 <T	8.400 <T	7.300 <T	.	.
APR	12.000 <T	14.000 <T	13.000 <T	12.000 <T	19.000 <T	14.000 <T
MAY	6.700 <T	7.000 <T	6.900 <T	7.000 <T	13.000 <T	7.100 <T
JUN	8.300 <T	7.300 <T	7.500 <T	7.400 <T	9.700 <T	7.600 <T
JUL	7.500 <T	6.800 <T	.	.	7.300 <T	8.200 <T
AUG	15.000 <T	9.400 <T	9.600 <T	9.700 <T	11.000 <T	11.000 <T
SEP	11.000 <T	10.000 <T	11.000 <T	10.000 <T	11.000 <T	11.000 <T
OCT	6.600 <T	8.700 <T	8.400 <T	7.100 <T	10.000 <T	6.700 <T
NOV	7.800 <T	7.600 <T	7.700 <T	7.500 <T	.	.
DEC	5.500 <T	5.100 <T	11.000 <T	11.000 <T	.	.
BERYLLIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 6800 (D4)	
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	.070 <T
MAR	BDL	BDL	BDL	BDL	.	.
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.
DEC	BDL	BDL	BDL	BDL	.	.
CADMIUM (UG/L)			DET'N LIMIT = 0.05		GUIDELINE = 5 (A1)	
JAN	BDL	BDL	.090 <T	BDL	.060 <T	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	.110 <T	BDL	.	.
APR	BDL	BDL	.250 <T	BDL	.090 <T	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	.060 <T	BDL	.090 <T	BDL	.090 <T	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	.060 <T	.070 <T	.090 <T	BDL
SEP	BDL	BDL	.060 <T	BDL	.070 <T	BDL
OCT	BDL	BDL	.150 <T	BDL	.080 <T	BDL
NOV	BDL	BDL	.330 <T	BDL	.	.
DEC	BDL	BDL	.420 <T	BDL	.	.
COBALT (UG/L)			DET'N LIMIT = 0.02		GUIDELINE = N/A	
JAN	.090 <T	.140 <T	.210 <T	.090 <T	.090 <T	.530 <T
FEB	.240 <T	.660 <T	9.000	.130 <T	.250 <T	BDL
MAR	.160 <T	.280 <T	.750 <T	.140 <T	.	.
APR	.130 <T	.590 <T	.140 <T	.200 <T	.320 <T	.120 <T
MAY	.080 <T	.110 <T	.090 <T	.100 <T	.080 <T	.070 <T
JUN	.120 <T	.120 <T	.190 <T	.370 <T	.110 <T	.100 <T
JUL	.130 <T	.120 <T	.	.	.140 <T	.110 <T
AUG	.100 <T	.150 <T	.130 <T	.120 <T	.220 <T	.040 <T
SEP	.280 <T	.160 <T	.090 <T	.090 <T	.120 <T	.190 <T
OCT	BDL	.060 <T	.070 <T	.440 <T	.180 <T	.060 <T
NOV	.330 <T	.130 <T	.080 <T	.220 <T	.	.
DEC	.090 <T	.280 <T	.090 <T	.070 <T	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHROMIUM (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 50 (A1)		
JAN	.730 <T	.550 <T	BDL	.890 <T	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	.	.
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	.660 <T	.640 <T	.650 <T	.580 <T	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	.530 <T	BDL	BDL	BDL	BDL	.520 <T
SEP	.780 <T	1.400 <T	.780 <T	.730 <T	.740 <T	.770 <T
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	.810 <T	.720 <T	.650 <T	.	.
DEC	.630 <T	BDL	1.500 <T	1.700 <T	.	.
COPPER (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = 1000 (A3)		
JAN	2.200 <T	2.500 <T	250.000	33.000	96.000	25.000
FEB	2.300 <T	2.500 <T	330.000	34.000	160.000	13.000
MAR	2.700 <T	2.900 <T	430.000	34.000	.	.
APR	2.200 <T	2.300 <T	260.000	44.000	350.000	28.000
MAY	1.800 <T	3.400 <T	240.000	33.000	320.000	23.000
JUN	2.100 <T	2.200 <T	100.000	29.000	350.000	34.000
JUL	1.700 <T	1.900 <T	.	.	330.000	32.000
AUG	2.100 <T	2.200 <T	360.000	72.000	76.000	33.000
SEP	1.800 <T	2.000 <T	490.000	61.000	490.000	43.000
OCT	1.600 <T	2.100 <T	390.000	38.000	600.000	81.000
NOV	2.000 <T	2.700 <T	260.000	26.000	.	.
DEC	1.900 <T	26.000	330.000	28.000	.	.
IRON (UG/L)			DET'N LIMIT = 6.00	GUIDELINE = 300 (A3)		
JAN	36.000 <T	35.000 <T	120.000	140.000	37.000 <T	36.000 <T
FEB	37.000 <T	46.000 <T	110.000	150.000	35.000 <T	10.000 <T
MAR	48.000 <T	50.000 <T	85.000	160.000	.	.
APR	33.000 <T	35.000 <T	92.000	120.000	45.000 <T	40.000 <T
MAY	36.000 <T	45.000 <T	82.000	110.000	34.000 <T	44.000 <T
JUN	33.000 <T	41.000 <T	93.000	86.000	24.000 <T	28.000 <T
JUL	21.000 <T	35.000 <T	.	.	27.000 <T	31.000 <T
AUG	26.000 <T	33.000 <T	58.000 <T	62.000	28.000 <T	12.000 <T
SEP	22.000 <T	42.000 <T	63.000	78.000	23.000 <T	30.000 <T
OCT	BDL	33.000 <T	62.000	88.000	25.000 <T	25.000 <T
NOV	40.000 <T	54.000 <T	120.000	140.000	.	.
DEC	49.000 <T	13.000 <T	170.000	110.000	.	.
MERCURY (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = 1 (A1)		
JAN	BDL	BDL	.	BDL	.	.
FEB	BDL	BDL	.	.	.	.
MAR	BDL	BDL	.	.	.	.
APR	BDL	BDL	.	.	.	.
MAY	BDL	BDL	.	.	.	.
JUN	BDL	.110	.	.	.	.
JUL	BDL	BDL	.	.	.	.
AUG	BDL	.080 <T	.	.	.	.
SEP	BDL	BDL	.	.	.	.
OCT	.030 <T	.030 <T	.	.	.	.
NOV	BDL	BDL	.	.	.	.
DEC	BDL	.320	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
MANGANESE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 50 (A3)		
JAN	6.700	7.000	9.300	9.000	6.000	6.000
FEB	6.400	6.400	9.600	9.300	5.600	.350 <T
MAR	8.100	7.900	8.500	9.200	.	.
APR	11.000	13.000	8.300	9.300	5.800	5.500
MAY	5.700	7.200	8.200	8.900	6.000	8.100
JUN	5.200	6.000	9.600	8.700	4.700	5.600
JUL	5.000	6.600	.	.	5.000	5.500
AUG	4.600	5.700	9.400	9.800	5.400	1.900
SEP	4.400	6.000	9.200	11.000	3.900	4.400
OCT	.430 <T	4.800	9.400	9.000	4.000	3.900
NOV	4.700	5.300	8.900	8.400	.	.
DEC	4.700	BDL	8.400	8.200	.	.
MOLYBDENUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = N/A		
JAN	.130 <T	.070 <T	.070 <T	BDL	BDL	BDL
FEB	.110 <T	.080 <T	.110 <T	BDL	BDL	.280 <T
MAR	.070 <T	.150 <T	BDL	.060 <T	.	.
APR	.100 <T	.090 <T	.060 <T	.060 <T	.070 <T	.120 <T
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	.060 <T	BDL	.080 <T	.060 <T	BDL
JUL	BDL	.080 <T	.	.	BDL	BDL
AUG	.080 <T	.070 <T	.080 <T	BDL	.070 <T	BDL
SEP	.060 <T	.080 <T	BDL	BDL	BDL	BDL
OCT	.080 <T	.090 <T	.080 <T	.070 <T	.070 <T	.070 <T
NOV	.090 <T	.080 <T	.080 <T	.060 <T	.	.
DEC	.110 <T	.980	BDL	BDL	.	.
NICKEL (UG/L)			DET'N LIMIT = 0.20	GUIDELINE = 350 (D3)		
JAN	.650 <T	.620 <T	27.000	.660 <T	4.300	.530 <T
FEB	.540 <T	.500 <T	500.000	.890 <T	10.000	.250 <T
MAR	.390 <T	.380 <T	450.000	1.000 <T	.	.
APR	1.000 <T	.850 <T	6.100	.980 <T	13.000	.950 <T
MAY	.570 <T	.630 <T	1.500 <T	.570 <T	5.300	.440 <T
JUN	.380 <T	.400 <T	130.000	.510 <T	3.000	.530 <T
JUL	.620 <T	.450 <T	.	.	2.400	.460 <T
AUG	.680 <T	.510 <T	4.000	.720 <T	64.000	.740 <T
SEP	.700 <T	.630 <T	3.100	.700 <T	1.100 <T	.790 <T
OCT	.470 <T	.690 <T	1.400 <T	.590 <T	38.000	.700 <T
NOV	.450 <T	.440 <T	2.500	.490 <T	.	.
DEC	.400 <T	BDL	1.400 <T	.670 <T	.	.
LEAD (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 10. (A1)		
JAN	.390 <T	.200 <T	28.000	2.200	11.000	.900
FEB	.120 <T	.130 <T	42.000	2.400	4.900	.160 <T
MAR	BDL	.170 <T	50.000	2.600	.	.
APR	.110 <T	.150 <T	68.000	4.700	16.000	1.100
MAY	.130 <T	.190 <T	16.000	2.400	14.000	.950
JUN	.100 <T	.100 <T	8.900	2.000	15.000	1.500
JUL	.060 <T	.160 <T	.	.	12.000	1.100
AUG	.150 <T	.120 <T	25.000	2.700	8.400	.610
SEP	.120 <T	.140 <T	29.000	3.600	13.000	1.500
OCT	BDL	.160 <T	25.000	2.100	7.100	2.000
NOV	.310 <T	.390 <T	34.000	2.300	.	.
DEC	.260 <T	.090 <T	34.000	1.500	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
ANTIMONY (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 146 (D4)		
JAN	.380 <T	.400 <T	.500 <T	.320 <T	.370 <T	.760
FEB	.560	1.400	14.000	.600	.550	.340 <T
MAR	.290 <T	.600	.360 <T	.410 <T	.	.
APR	.430 <T	1.000	.520	.620	.670	.370 <T
MAY	.400 <T	.420 <T	.410 <T	.490 <T	.410 <T	.420 <T
JUN	.370 <T	.480 <T	.510	.820	.620	.430 <T
JUL	.420 <T	.480 <T	.	.	.470 <T	.500 <T
AUG	.380 <T	.530	.540	.520	.410 <T	.340 <T
SEP	.660	.450 <T	.540	.420 <T	.390 <T	.550
OCT	.250 <T	.400 <T	.480 <T	1.500	.550	.480 <T
NOV	.780	.470 <T	.460 <T	.560	.	.
DEC	.490 <T	7.600	.630	.520	.	.
SELENIUM (UG/L)			DET'N LIMIT = 1.00	GUIDELINE = 10 (A1)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	1.200 <T	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	.	.
APR	BDL	BDL	BDL	BDL	1.300 <T	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	1.300 <T	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.
DEC	BDL	3.500 <T	BDL	BDL	.	.
STRONTIUM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = N/A		
JAN	51.000	50.000	54.000	50.000	54.000	53.000
FEB	47.000	45.000	51.000	47.000	49.000	47.000
MAR	50.020	50.000	53.000	48.000	.	.
APR	48.000	49.000	47.000	49.000	52.000	49.000
MAY	48.000	47.000	48.000	47.000	47.000	47.000
JUN	44.000	45.000	45.000	43.000	45.000	43.000
JUL	46.000	44.000	.	.	45.000	44.000
AUG	48.000	46.000	45.000	44.000	47.000	46.000
SEP	46.000	44.000	46.000	46.000	45.000	45.000
OCT	45.000	44.000	45.000	41.000	45.000	44.000
NOV	46.000	45.000	46.000	45.000	.	.
DEC	41.000	65.000	45.000	45.000	.	.
TITANIUM (UG/L)			DET'N LIMIT = 0.50	GUIDELINE = N/A		
JAN	7.100	6.800	2.700 <T	2.600 <T	3.100 <T	3.200 <T
FEB	7.900	12.000	2.900 <T	2.500 <T	2.800 <T	2.000 <T
MAR	2.600 <T	3.300 <T	3.000 <T	3.400 <T	.	.
APR	2.900 <T	3.100 <T	3.100 <T	3.200 <T	4.300 <T	4.300 <T
MAY	2.400 <T	3.000 <T	3.500 <T	3.100 <T	3.400 <T	3.400 <T
JUN	4.000 <T	5.100	5.400	5.300	5.100	4.800 <T
JUL	1.900 <T	2.100 <T	.	.	2.100 <T	2.500 <T
AUG	3.400 <T	4.200 <T	4.200 <T	3.800 <T	5.500	3.900 <T
SEP	1.300 <T	1.600 <T	1.600 <T	1.800 <T	1.400 <T	1.500 <T
OCT	1.500 <T	2.300 <T	2.600 <T	2.500 <T	2.700 <T	2.400 <T
NOV	2.100 <T	3.100 <T	2.900 <T	2.900 <T	.	.
DEC	1.600 <T	1.300 <T	2.500 <T	2.500 <T	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
THALLIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 13 (D4)		
JAN	.260 <T	.170 <T	.180 <T	.140 <T	.060 <T	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	.	.
APR	.060 <T	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	BDL	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	.120 <T	.150 <T	.	.
DEC	BDL	BDL	BDL	BDL	.	.
URANIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (A1)		
JAN	BDL	BDL	BDL	BDL	BDL	BDL
FEB	BDL	BDL	BDL	BDL	BDL	BDL
MAR	BDL	BDL	BDL	BDL	.	.
APR	BDL	BDL	BDL	BDL	BDL	BDL
MAY	BDL	BDL	BDL	BDL	BDL	BDL
JUN	BDL	BDL	BDL	BDL	BDL	BDL
JUL	BDL	BDL	.	.	BDL	BDL
AUG	BDL	BDL	.060 <T	BDL	.060 <T	BDL
SEP	BDL	BDL	BDL	BDL	BDL	BDL
OCT	BDL	BDL	BDL	BDL	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.
DEC	BDL	.080 <T	BDL	BDL	.	.
VANADIUM (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = N/A		
JAN	.120 <T	.130 <T	.110 <T	.110 <T	.120 <T	.120 <T
FEB	.220 <T	.200 <T	.080 <T	BDL	.090 <T	.110 <T
MAR	BDL	BDL	BDL	BDL	.	.
APR	.110 <T	.140 <T	.170 <T	.170 <T	.230 <T	.180 <T
MAY	BDL	.060 <T	BDL	BDL	.060 <T	BDL
JUN	.060 <T	BDL	BDL	BDL	BDL	.060 <T
JUL	.080 <T	.110 <T	.	.	.090 <T	.090 <T
AUG	BDL	.060 <T	BDL	BDL	BDL	BDL
SEP	.130 <T	.120 <T	.090 <T	BDL	.060 <T	.060 <T
OCT	BDL	BDL	BDL	.070 <T	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.
DEC	BDL	BDL	BDL	BDL	.	.
ZINC (UG/L)			DET'N LIMIT = 0.20	GUIDELINE = 5000 (A3)		
JAN	10.000	10.000	38.000	9.000	16.000	9.300
FEB	10.000	10.000	250.000	9.200	16.000	2.700
MAR	11.000	11.000	460.000	9.400	.	.
APR	11.000	11.000	66.000	11.000	20.000	8.400
MAY	10.000	11.000	18.000	8.000	19.000	10.000
JUN	10.000	9.800	37.000	7.800	20.000	9.000
JUL	11.000	11.000	.	.	25.000	11.000
AUG	10.000	10.000	28.000	9.900	25.000	6.700
SEP	11.000	11.000	55.000	13.000	23.000	15.000
OCT	6.700	9.600	20.000	8.400	39.000	9.200
NOV	9.700	11.000	32.000	8.300	.	.
DEC	7.500	1.700 <T	16.000	5.400	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROAROMATICS						
245 TRICHLOROTOLUENE (NG/L)			DET'N LIMIT = 5.000		GUIDELINE = N/A	
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	.
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	30.000 <T	.	BDL
OCT	BDL	!!S	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROPHENOLS						
246-TRICHLOROPHENOL (NG/L)		DET'N LIMIT = 20		GUIDELINE = 5000 (A1)		
MAY	BDL	20.000 <T	.	.	.	.
NOV	BDL	90.000 <T	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PESTICIDES & PCB						
ALPHA BHC (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 700 (G)		
JAN	2.000 <T	1.000 <T	.	1.000 <T	.	1.000 <T
FEB	BDL	BDL	.	1.000 <T	.	BDL
MAR	1.000 <T	2.000 <T	.	1.000 <T	.	.
APR	BDL	2.000 <T	.	1.000 <T	.	BDL
MAY	1.000 <T	1.000 <T	.	1.000 <T	.	1.000 <T
JUN	1.000 <T	2.000 <T	.	2.000 <T	.	2.000 <T
JUL	1.000 <T	1.000 <T	.	.	.	1.000 <T
AUG	BDL	BDL	.	2.000 <T	.	BDL
SEP	BDL	1.000 <T	.	BDL	.	BDL
OCT	BDL	!!S	.	1.000 <T	.	1.000 <T
NOV	1.000 <T	2.000 <T	.	1.000 <T	.	.
DEC	1.000 <T	1.000 <T	.	1.000 <T	.	.
HEPTACHLOR EPOXIDE (NG/L)			DET'N LIMIT = 1.000	GUIDELINE = 3000 (A1)		
JAN	BDL	BDL	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	2.000 <T	.	BDL	.	.
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	!!S	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
PHENOLICS (UG/L PHENOLICS)			DET'N LIMIT = .200	GUIDELINE = 2 (A4)		
JAN	.600 <T	.600 <T	.	.	.	.
FEB	.600 <T	.600 <T	.	.	.	.
MAR	.600 <T	.600 <T	.	.	.	.
APR	BDL	BDL	.	.	.	.
MAY	BDL	BDL	.	.	.	.
JUN	BDL	BDL	.	.	.	.
JUL	BDL	BDL	.	.	.	.
AUG	BDL	.400 <T	.	.	.	.
SEP	BDL	.600 <T	.	.	.	.
OCT	.400 <T	.400 <T	.	.	.	.
NOV	BDL	BDL	.	.	.	.
DEC	.800 <T	.600 <T	.	.	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES						
BENZENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 5 (A1)		
JAN	BDL	IAR	.	BDL	.	BDL
FEB	BDL	.100 <T	.	.050 <T	.	.050 <T
MAR	BDL	BDL	.	BDL	.	.
APR	BDL	.050 <T	.	.050 <T	.	BDL
MAY	BDL	.100 <T	.	BDL	.	BDL
JUN	BDL	.050 <T	.	BDL	.	BDL
JUL	BDL	.050 <T	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.
TOLUENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 24 (A3)		
JAN	BDL	IAR	.	BDL	.	BDL
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	.
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	.050 <T	.	BDL	.	.050 <T
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.
ETHYLBENZENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 2.4 (A3)		
JAN	BDL	IAR	.	BDL	.	BDL
FEB	BDL	.100 <T	.	.100 <T	.	.100 <T
MAR	BDL	.100 <T	.	.200 <T	.	.
APR	.050 <T	.100 <T	.	.150 <T	.	.100 <T
MAY	BDL	.050 <T	.	BDL	.	.150 <T
JUN	BDL	.050 <T	.	.100 <T	.	.200 <T
JUL	BDL	.050 <T	.	.	.	.150 <T
AUG	BDL	BDL	.	.100 <T	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.
STYRENE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 100 (D1)		
JAN	BDL	IAR	.	BDL	.	BDL
FEB	BDL	.150 <T	.	.150 <T	.	.150 <T
MAR	BDL	.150 <T	.	.300 <T	.	.
APR	.100 <T	.150 <T	.	.250 <T	.	.100 <T
MAY	BDL	.100 <T	.	BDL	.	.150 <T
JUN	BDL	.100 <T	.	.150 <T	.	.250 <T
JUL	BDL	.100 <T	.	.	.	.200 <T
AUG	BDL	BDL	.	.100 <T	.	BDL
SEP	BDL	BDL	.	.050 <T	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT			DISTRIBUTION SYSTEM		
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
CHLOROFORM (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)		
JAN	BDL	IAR	.	39.800	.	48.100
FEB	BDL	32.900	.	38.300	.	45.500
MAR	BDL	44.300	.	44.200	.	.
APR	BDL	38.100	.	38.500	.	43.200
MAY	BDL	41.500	.	41.100	.	39.700
JUN	BDL	54.300	.	41.900	.	62.600
JUL	BDL	39.700	.	.	.	38.700
AUG	BDL	42.200	.	42.500	.	45.500
SEP	BDL	36.400	.	34.400	.	46.900
OCT	BDL	38.100	.	33.100	.	51.200
NOV	BDL	46.700	.	38.600	.	.
DEC	BDL	45.300	.	38.400	.	.
111, TRICHLOROETHANE (UG/L)			DET'N LIMIT = 0.02	GUIDELINE = 200 (D1)		
JAN	BDL	IAR	.	.120 <T	.	.060 <T
FEB	BDL	BDL	.	BDL	.	BDL
MAR	BDL	BDL	.	BDL	.	.
APR	BDL	BDL	.	BDL	.	BDL
MAY	BDL	BDL	.	BDL	.	BDL
JUN	BDL	BDL	.	BDL	.	BDL
JUL	BDL	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	BDL
SEP	BDL	BDL	.	BDL	.	BDL
OCT	BDL	BDL	.	BDL	.	BDL
NOV	BDL	BDL	.	BDL	.	.
DEC	BDL	BDL	.	BDL	.	.
DICHLOROBROMOMETHANE (UG/L)			DET'N LIMIT = 0.05	GUIDELINE = 350 (A1+)		
JAN	BDL	IAR	.	4.300	.	4.900
FEB	BDL	3.850	.	4.150	.	4.700
MAR	BDL	4.550	.	4.450	.	.
APR	BDL	4.050	.	3.750	.	3.950
MAY	BDL	3.700	.	3.400	.	3.400
JUN	BDL	4.650	.	3.700	.	5.000
JUL	BDL	3.700	.	.	.	3.600
AUG	BDL	4.150	.	3.950	.	4.100
SEP	BDL	3.650	.	3.300	.	4.100
OCT	BDL	3.800	.	3.150	.	4.350
NOV	BDL	4.100	.	3.500	.	.
DEC	BDL	3.900	.	3.500	.	.
CHLORODIBROMOMETHANE (UG/L)			DET'N LIMIT = 0.10	GUIDELINE = 350 (A1+)		
JAN	BDL	IAR	.	.200 <T	.	.200 <T
FEB	BDL	.200 <T	.	.200 <T	.	.300 <T
MAR	BDL	.300 <T	.	.200 <T	.	.
APR	BDL	.200 <T	.	.200 <T	.	.200 <T
MAY	BDL	.200 <T	.	.200 <T	.	.100 <T
JUN	BDL	.200 <T	.	.200 <T	.	.200 <T
JUL	BDL	.200 <T	.	.	.	.200 <T
AUG	BDL	.200 <T	.	.200 <T	.	.200 <T
SEP	BDL	.200 <T	.	.200 <T	.	.200 <T
OCT	BDL	.200 <T	.	.200 <T	.	.200 <T
NOV	BDL	.200 <T	.	.200 <T	.	.
DEC	BDL	.200 <T	.	.200 <T	.	.

TABLE 5
DRINKING WATER SURVEILLANCE PROGRAM NORTH BAY WTP 1990

	WATER TREATMENT PLANT				DISTRIBUTION SYSTEM	
	RAW	TREATED	SITE 1		SITE 3	
			STANDING	FREE FLOW	STANDING	FREE FLOW
TOTAL TRIHALOMETHANES (UG/L)			DET'N LIMIT = 0.50		GUIDELINE = 350 (A1)	
JAN	BDL	!AR	.	44.250	.	53.250
FEB	BDL	37.000	.	42.700	.	50.450
MAR	BDL	49.150	.	48.850	.	.
APR	BDL	42.350	.	42.450	.	47.350
MAY	BDL	45.350	.	44.650	.	43.250
JUN	BDL	59.150	.	45.800	.	67.800
JUL	BDL	43.600	.	.	.	42.500
AUG	BDL	46.600	.	46.700	.	49.850
SEP	BDL	40.250	.	37.800	.	51.200
OCT	BDL	42.100	.	36.400	.	55.750
NOV	BDL	50.950	.	42.250	.	.
DEC	BDL	49.400	.	42.000	.	.

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
FECAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	0 (A1)
STANDARD PLATE COUNT MEMBRANE FILT.	CT/ML	0	500/ML (A3)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100ML (A1)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	0	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	0	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	0	N/A
FIELD PH	DMNSLESS	N/A	6.5-8.5 (A3)
FIELD TEMPERATURE	DEG.C	N/A	15.0 (A3)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	0.2	30-500 (A3)
AMMONIUM TOTAL	MG/L	0.002	0.05 (F2)
CALCIUM	MG/L	0.2	100 (F2)
CHLORIDE	MG/L	0.2	250 (A3)
COLOUR	TCU	0.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.0	400 (F2)
CYANIDE	MG/L	0.001	0.2 (A1)
DISSOLVED ORGANIC CARBON	MG/L	0.1	5.0 (A3)
FLUORIDE	MG/L	0.01	2.4 (A1)
HARDNESS	MG/L	0.5	80-100 (A4)
LANGELIERS INDEX	DMNSLESS	N/A	N/A
MAGNESIUM	MG/L	0.1	30.0 (F2)
NITRITE	MG/L	0.001	1.0 (A1)
NITROGEN TOTAL KJELDAHL	MG/L	0.02	N/A
PH	DMNSLESS	N/A	6.5-8.5 (A4)
PHOSPHORUS FIL REACT	MG/L	0.0005	N/A
PHOSPHORUS TOTAL	MG/L	0.002	0.4 (F2)
SODIUM	MG/L	0.2	200 (A4)
SULPHATE	MG/L	0.2	500 (A3)
TOTAL NITRATES	MG/L	0.005	10.0 (A1)
TURBIDITY	FTU	0.05	1.0 (A1)
CHLOROAROMATICS			
123 TRICHLOROBENZENE	NG/L	5.0	N/A
1234 TETRACHLOROBENZENE	NG/L	1.0	N/A
1235 TETRACHLOROBENZENE	NG/L	1.0	N/A
124 TRICHLOROBENZENE	NG/L	5.0	10000 (I)
1245-TETRACHLOROBENZENE	NG/L	1.0	38000 (D4)
135 TRICHLOROBENZENE	NG/L	5.0	N/A
236 TRICHLOROTOLUENE	NG/L	5.0	N/A
245 TRICHLOROTOLUENE	NG/L	5.0	N/A
26A TRICHLOROTOLUENE	NG/L	5.0	N/A
HEXACHLOROBENZENE	NG/L	1.0	10 (C1)
HEXACHLOROBUTADIENE	NG/L	1.0	450 (D4)
HEXACHLOROCYCLOPENTADIENE	NG/L	5.0	206000 (D4)
HEXACHLOROETHANE	NG/L	1.0	1900 (D4)
OCTACHLOROSTYRENE	NG/L	1.0	N/A
PENTACHLOROBENZENE	NG/L	1.0	74000 (D4)
CHLOROPHENOLS			
234 TRICHLOROPHENOL	NG/L	100.0	N/A
2345 TETRACHLOROPHENOL	NG/L	20.0	N/A
2356 TETRACHLOROPHENOL	NG/L	10.0	N/A

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
245 TRICHLOROPHENOL	NG/L	100.0	2600000 (D4)
246 TRICHLOROPHENOL	NG/L	20.0	5000 (A1)
PENTACHLOROPHENOL	NG/L	10.0	60000 (A1)
METALS			
ALUMINUM	UG/L	0.10	100 (A4)
ANTIMONY	UG/L	0.05	146 (D4)
ARSENIC	UG/L	0.10	25 (A1)
BARIUM	UG/L	0.05	1000 (A2)
BERYLLIUM	UG/L	0.05	6800 (D4)
BORON	UG/L	2.00	5000 (A1)
CADMIUM	UG/L	0.05	5 (A1)
CHROMIUM	UG/L	0.50	50 (A1)
COBALT	UG/L	0.02	N/A
COPPER	UG/L	0.50	1000 (A3)
IRON	UG/L	6.00	300 (A3)
LEAD	UG/L	0.05	10 (A1)
MANGANESE	UG/L	0.05	50 (A3)
MERCURY	UG/L	0.02	1 (A1)
MOLYBDENUM	UG/L	0.05	N/A
NICKEL	UG/L	0.20	350 (D3)
SELENIUM	UG/L	1.00	10 (A1)
SILVER	UG/L	0.05	50 (A1)
STRONTIUM	UG/L	0.10	N/A
THALLIUM	UG/L	0.05	13 (D4)
TITANIUM	UG/L	0.50	N/A
URANIUM	UG/L	0.05	100 (A1)
VANADIUM	UG/L	0.05	N/A
ZINC	UG/L	0.20	5000 (A3)
PAH			
ANTHRACENE	NG/L	1.0	N/A
BENZO(A) ANTHRACENE	NG/L	20.0	N/A
BENZO(A) PYRENE	NG/L	5.0	10.0 (A1)
BENZO(B) CHRYSENE	NG/L	2.0	N/A
BENZO(B) FLUORANTHENE	NG/L	10.0	N/A
BENZO(E) PYRENE	NG/L	50.0	N/A
BENZO(G,H,I) PERYLENE	NG/L	20.0	N/A
BENZO(K) FLUORANTHENE	NG/L	1.0	N/A
CHRYSENE	NG/L	50.0	N/A
CORONENE	NG/L	10.0	N/A
DIBENZO(A,H) ANTHRACENE	NG/L	10.0	N/A
DIMETHYL BENZO(A) ANTHRACENE	NG/L	5.0	N/A
FLUORANTHENE	NG/L	20.0	42000.0 (D4)
INDENO(1,2,3-C,D) PYRENE	NG/L	20.0	N/A
PERYLENE	NG/L	10.0	N/A
PHENANTHRENE	NG/L	10.0	N/A
PYRENE	NG/L	20.0	N/A
PESTICIDES & PCB			
ALACHLOR (LASSO)	NG/L	500.0	5000 (A2)
ALDRIN	NG/L	1.0	700 (A1)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700 (G)
ALPHA CHLORDANE	NG/L	2.0	7000 (A1)
AMETRINE	NG/L	50.0	300000 (D3)
ATRATONE	NG/L	50.0	N/A
ATRAZINE	NG/L	50.0	60000 (A2)
DES ETHYL ATRAZINE	NG/L	200.0	60000 (A2)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300 (G)
CYANAZINE (BLADEX)	NG/L	100.0	10000 (A2)
O,P-DDD	NG/L	5.0	10 (I)
DIELDRIN	NG/L	2.0	700 (A1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000 (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	5.0	74000 (D4)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
ENDOSULFAN SULPHATE (THIODAN SULPHATE)	NG/L	5.0	N/A
ENDRIN	NG/L	5.0	1600 (D3)
GAMMA CHLORDANE	NG/L	2.0	7000 (A1)
HEPTACHLOR	NG/L	1.0	3000 (A1)
HEPTACHLOR EPOXIDE	NG/L	1.0	3000 (A1)
LINDANE (GAMMA BHC)	NG/L	1.0	4000 (A1)
METHOXYCHLOR	NG/L	5.0	900000 (A1)
METOLACHLOR	NG/L	500.0	50000 (A2)
METRIBUZIN (SENCOR)	NG/L	100.0	80000 (A1)
MIREX	NG/L	5.0	N/A
P,P-DDD	NG/L	5.0	N/A
O,P-DDT	NG/L	5.0	30000 (A1)
OXYCHLORDANE	NG/L	2.0	N/A
PCB	NG/L	20.0	3000 (A2)
PPDDE	NG/L	1.0	30000 (A1)
PPDDT	NG/L	5.0	30000 (A1)
PROMETONE	NG/L	50.0	52500 (D3)
PROMETRYNE	NG/L	50.0	1000 (A2)
PROPAZINE	NG/L	50.0	700000 (D3)
SIMAZINE	NG/L	50.0	10000 (A2)
D-ETHYL SIMAZINE	NG/L	200.0	10000 (A2)
TOXAPHENE	NG/L	500.0	5000 (A1)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	0.2	2 (A4)
SPECIFIC PESTICIDES			
2,4 D PROPIONIC ACID	NG/L	100.	N/A
2,4,5-TRICHLOROPHENOXY ACETIC ACID	NG/L	50.	280000 (A1)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000 (A1)
24-DICHLORORPHENOXYBUTYRIC ACID (24-DB)	NG/L	200.	18000 (B3)
BUTYLATE (SUTAN)	NG/L	2000.	245000 (D3)
CARBARYL (SEVIN)	NG/L	200.	90000 (A1)
CARBOFURAN	NG/L	2000.	90000 (A1)
CHLORPYRIFOS (DURSBAN)	NG/L	20.	N/A
CICP (CHLORPROPHAM)	NG/L	2000.	350000 (G)
DIALLATE	NG/L	2000.	N/A
DIAZINON	NG/L	20.	20000 (A1)
DICAMBA	NG/L	50.	120000 (A1)
DICHLOROVOS	NG/L	20.	N/A
EPTAM	NG/L	2000.	N/A
ETHION	NG/L	20.	35000 (G)
IPC	NG/L	2000.	N/A
MALATHION	NG/L	20.	190000 (A1)
METHYL PARATHION	NG/L	50.	7000 (B3)
METHYLTRITHION	NG/L	20.	N/A
MEVINPHOS	NG/L	20.	N/A
PARATHION	NG/L	20.	50000 (A1)
PHORATE (THIMET)	NG/L	20.	2000 (A2)
PROPOXUR (BAYGON)	NG/L	2000.	140000 (D3)
RELDAN	NG/L	20.	N/A
RONNEL	NG/L	20.	N/A
SILVEX (2,4,5-TP)	NG/L	20.	10000 (A1)
VOLATILES			
1,1 DICHLOROETHANE	UG/L	0.10	N/A
1,1 DICHLOROETHYLENE	UG/L	0.10	7 (D1)
1,2 DICHLOROBENZENE	UG/L	0.05	200 (A1)
1,2 DICHLOROETHANE	UG/L	0.05	5 (A1)

TABLE 6
DRINKING WATER SURVEILLANCE PROGRAM 1990

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
1,2 DICHLOROPROPANE	UG/L	0.05	5 (D1)
1,3 DICHLOROBENZENE	UG/L	0.10	3750 (D3)
1,4 DICHLOROBENZENE	UG/L	0.10	5 (A1)
111, TRICHLOROETHANE	UG/L	0.02	200 (D1)
112 TRICHLOROETHANE	UG/L	0.05	0.6 (D4)
1122 TETRACHLOROETHANE	UG/L	0.05	0.17(D4)
BENZENE	UG/L	0.05	5 (A1)
BROMOFORM	UG/L	0.20	350 (A1+)
CARBON TETRACHLORIDE	UG/L	0.20	5 (A1)
CHLOROBENZENE	UG/L	0.10	1510 (D3)
CHLORODIBROMOMETHANE	UG/L	0.10	350 (A1+)
CHLOROFORM	UG/L	0.10	350 (A1+)
DICHLOROBROMOMETHANE	UG/L	0.05	350 (A1+)
ETHLYENE DIBROMIDE	UG/L	0.05	50 (D1)
ETHYLBENZENE	UG/L	0.05	2.4 (A3)
M-XYLENE	UG/L	0.10	300 (A3*)
METHYLENE CHLORIDE	UG/L	0.50	50 (A1)
O-XYLENE	UG/L	0.05	300 (A3*)
P-XYLENE	UG/L	0.10	300 (A3*)
STYRENE	UG/L	0.05	100 (D1)
TETRACHLOROETHYLENE	UG/L	0.05	5 (D1)
TRANS 1,2 DICHLOROETHYLENE	UG/L	0.10	70 (D1)
TOLUENE	UG/L	0.05	24 (A3)
TOTAL TRIHALOMETHANES	UG/L	0.50	350 (A1)
TRICHLOROETHYLENE	UG/L	0.10	50 (A1)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM
PROGRAM DESCRIPTION

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality;
- a flagging mechanism for guideline exceedance;
- a definition of contaminant levels and trends;
- a comprehensive background for remedial action;
- a framework for assessment of new contaminants; and
- an indication of treatment efficiency of plant processes.

PROGRAM

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario. In 1990, 76 systems were being monitored. Water supply locations have been prioritized for surveillance based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit.

A major goal of the program is to collect valid water quality data in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analyzed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling, in order to acquire complete plant process and distribution system details and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of raw (ambient water) and treated water at the treatment plant and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled. Sampling is carried out by operational personnel who have been trained in applicable procedures.

Comprehensive standardized procedures and field test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". Most laboratory analyses are carried out by the Ministry of Environment (MOE), Laboratory Services Branch. Radionuclides are analyzed by the Ministry of Labour.

DATA REPORTING MECHANISM

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP unit.

PROGRAM INPUTS AND OUTPUTS

There are four major inputs and four major outputs in the program.

Program Input - Plant and Distribution System Description

The system description includes plant specific non-analytical information acquired through a questionnaire and an initial plant visit. During the initial assessment of the plant and distribution system, questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The Plant and Distribution System Description consists of the following seven components:

1. PROCESS COMPONENT INVENTORY

All physical and chemical processes to which the water is subjected, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. TREATMENT CHEMICALS

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. Chemical dosages applied on the day of sampling are recorded in DWSP.

3. PROCESS CONTROL MEASUREMENTS

Documentation of in-plant monitoring of process parameters (eg. turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in this section. Except for the recorded Field Data, in-plant monitoring results are not retained in DWSP but are retained by the water treatment plant personnel.

4. DESIGN FLOW AND RETENTION TIME

Hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. Maximum, minimum and average flow, as well as a record of the flow rate on the day of sampling, are recorded in DWSP.

5. DISTRIBUTION SYSTEM DESCRIPTION

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. SAMPLING SYSTEM

Each plant is assessed for its adequacy in terms of the sampling of bacteriological, organic and inorganic parameters. Prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant, preferably a lab area; and

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake,

discharge and tap); pump characteristics (model, type, capacity); and flow rate.

7. PERSONNEL
This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate MOE personnel associated with the plant.

Program Input - Field Data

The second major input to DWSP is field data. Field data is collected at the plant and from the distribution system sites on the day of sampling. Field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used, dosages, flow and retention time on the day of sampling, as well as, monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free, combined and total), temperature and pH. These parameters are analyzed according to standardized DWSP protocols to allow for interplant comparison.

Program Input - Laboratory Analytical Data

The third major input to DWSP is Laboratory Analytical Data. Samples gathered from the raw, treated and distribution sampling sites are analyzed for the presence of approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. Parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments, parameters may be measured in a "scan" producing some results for parameters that are not on the DWSP priority list, but which may be of interest. The majority of parameters are measured on a routine basis. Those that are technically more difficult and/or costly to analyze, however, are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change, notation will be made and comparison data documented.

Program Input - Parameter Reference Information

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analyzed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database. An example is shown in figure 1.

Program output - Query

All DWSP information is easily accessed through the Query function, therefore, anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

Program Output - Action Alerts

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the Ontario Drinking Water Objectives publication. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective, an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of the confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedances at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, guidelines/limits from other agencies are used. The Parameter Listing System, published by MOE (ISBN 0-7729-4461-X), catalogues and keeps current guidelines for 650 parameters from agencies throughout the world. If these guidelines are exceeded, the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

Program Output - Report Generation

Custom reports can be generated from DWSP to meet MOE Regional needs and to respond to public requests.

Program Output - Annual Reports

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG.1

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

PARAMETER REFERENCE INFORMATION

BENZENE (B2001P) VOLATILES

CLASS: HEALTH METHOD: POCODO UNIT: µg/L

SOURCE	FROM	TO	METHOD	GUIDELINE	UNIT	NOTE
CAL C	85/01			0.700	µg/L	AL
CDWG C	87/01			5.000	µg/L	MAC
EPA C	87/07			5.000	µg/L	MCL
EPAA C	80/11			6.600	µg/L	AMBIENT **
FERC C	84/05			1.000	µg/L	MCL
WHO C	84/01			10.000	µg/L	GV

DESCRIPTION:**NAME:** BENZENE

CAS#: 71-43-2

MOLECULAR FORMULAE: C_6H_6

DETECTION LIMIT: (FOR METHOD POCODO) 0.05 µg/L

SYNONYMS: BENZOL; BENZOLE; COAL NAPHTHA; CARBON OIL (27). CYCLOHEXATRIENE (41).

CHARACTERISTICS: COLOURLESS TO LIGHT-YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC ODOUR; VAPOURS BURN WITH SMOKING FLAME (30).

PROPERTIES: SOLUBILITY IN WATER: 1780-1800 mg/L AT 25C (41). THRESHOLD ODOUR: 0.5 - 10 PPM IN WATERTHRESHOLD TASTE: 0.5 mg/L IN WATER (39).
ENVIRONMENTAL FATE: MAY BIOACCUMULATE IN LIVING ORGANISMS AND APPEARS TO ACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT A HIGH LIPID CONTENT OR REPRESENT MAJOR METABOLIC SITES, SUCH AS LIVER OR BRAIN; SMALL QUANTITIES EVAPORATE FROM SOILS OR ARE DEGRADED RATHER QUICKLY (80).

SOURCES: COMMERCIAL: PETROLEUM REFINING; SOLVENT RECOVERY; COAL TAR DISTILLATION (39); FOOD PROCESSING AND TANNING INDUSTRIES; COMBUSTION OF CAR EXHAUST.
ENVIRONMENTAL: POSSIBLE SOURCE IS RUNOFF.

USES: DETERGENTS; NYLON; INTERMEDIATE IN PRODUCTION OF OTHER COMPOUNDS, SUCH AS PESTICIDES; SOLVENT FOR EXTRACTION AND RECTIFICATION IN RUBBER INDUSTRY; DEGREASING AND CLEANSING AGENT; GASOLINE.

TOXICITY: RATING: 4 (VERY TOXIC).
ACUTE: IRRITATING TO MUCOUS MEMBRANES; SYMPTOMS INCLUDE RESTLESSNESS, CONVULSIONS, EXCITEMENT, DEPRESSION; DEATH MAY FOLLOW RESPIRATORY FAILURE.
CHRONIC: MAY CAUSE ANAEMIA AND LEUKAEMIA (45); MUTAGENIC.
MODE OF ACTION: CHROMOABERRATION IN LYMPHOCYTE CULTURES.

CARCINOGENICITY: A KNOWN HUMAN CARCINOGEN.

REMOVAL: THE FOLLOWING PROCESSES HAVE BEEN SUCCESSFUL IN REMOVING BENZENE FROM WASTEWATER: GAC ADSORPTION, PRECIPITATION WITH ALUM AND SUBSEQUENT REMOVAL VIA SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION

ADDITIONAL PROPERTIES:
MOLECULAR WEIGHT: 78.12
MELTING POINT: 5.5°C (27).
BOILING POINT: 80.1°C (27).
SPECIFIC GRAVITY: 0.8790 AT 20°C (27).
VAPOUR PRESSURE: 100 MM AT 26.1°C (27).
HENRY'S LAW CONSTANT: 0.00555 ATM-M3/MOLE (41).
LOG OCT./WATER PARTITION COEFFICIENT: 1.95 TO 2.13 (39).
CARBON ADSORPTION: K=1.0; 1/N=1.6; R=0.97; PH=5.3 (41)SEDIMENT/WATER PARTITION COEFFICIENT: NO DATA

NOTES: EPA PRIORITY POLLUTANT.

Appendix B

DWSP SAMPLING GUIDELINE

i) Raw and Treated at Plant

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-220 mL plastic bottle with white seal on cap -do not rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)
Volatiles (duplicates) (OPOPUP)	-45 mL glass vial with septum (teflon side must be in contact with sample) -do not rinse bottle -fill bottle completely without bubbles
Organics (OWOC),(OWTRI),(OAPAHX)	-1 L amber glass bottle per scan -do not rinse bottle -fill to 2 cm from top -when 'special pesticides' are requested three extra bottles must be filled

Cyanide	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops sodium hydroxide (NaOH) (**Caution:** NaOH is corrosive)
Mercury	-250 mL glass bottle -rinse bottle and cap three times -fill to top of label -add 20 drops each nitric acid (HNO_3) and potassium dichromate ($K_2Cr_2O_7$) (**Caution:** HNO_3&$K_2Cr_2O_7$ are corrosive)
Phenols	-250 mL glass bottle -do <u>not</u> rinse bottle, preservative has been added -fill to top of label
Radionuclides (as scheduled)	-4 L plastic jug -do <u>not</u> rinse, carrier added -fill to 5 cm from top
Organic Characterization (GC/MS - once per year)	-1 L amber glass bottle; instructions as per organic -250 mL glass bottle -do <u>not</u> rinse bottle -fill completely without bubbles

<u>Steps:</u>

1. Let sampling water tap run for an adequate time to clear the sample line.

2. Record time of day on submission sheet.

3. Record temperature on submission sheet.

4. Fill up all bottles as per instructions.

5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid (HNO_3) (**Caution:** HNO_3 is corrosive)

Steps:

1. Record time of day on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL plastic bottle (PET 500) -rinse bottle and cap with sample water three times -fill to 2 cm from top
Bacteriological	-250 mL plastic bottle with white seal on cap -do not rinse bottle, preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked

Metals	-500 mL plastic bottle (PET 500) -rinse bottle and cap three times -fill to 2 cm from top -add 10 drops nitric acid HNO_3 (**Caution:** HNO_3 is corrosive)
Volatiles (duplicate) **(OPOPUP)**	-45 mL glass vial with septum (teflon side must be in contact with sample) -do <u>not</u> rinse bottle, preservative has been added -fill bottle completely without bubbles
Organics **(OWOC) (OAPAHX)**	-1 L amber glass bottle per scan -do <u>not</u> rinse bottle -fill to 2 cm from top

<u>Steps:</u>

1. Record time of day on submission sheet.

2. Let cold water flow for five minutes.

3. Record temperature on submission sheet.

4. Fill all bottles as per instructions.

5. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.